

SHOTGUN ONE

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LAND FORCES

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Fact Sheets

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ADF Issue

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BUSHMASTER IMV



Photo: Wikipedia: Bushmaster infantry mobility vehicle from the Al Muthanna Task Group moves off a dirt track to rendezvous with soldiers from the Australian Army Training Team - Iraq in the wastelands south of Al Khidr in the Al Muthanna province.

Introduction

The Bushmaster Infantry Mobility Vehicle is an Australian built wheeled armoured vehicle designed by Perry Engineering in Adelaide with some technical support from Irish company Timoney Technology Ltd. The prototype, the basic design and the tender were acquired by Thales Australia, as Perry Engineering considered it non-core business. Once the Bushmaster was selected by the Australian Army to meet the Bushranger project requirements, it was developed further in Bendigo. Oshkosh Truck has a contract to provide support and would manufacture in the US if there was an American order. The Bushmaster is currently in service with the Australian Army, Royal Australian Air Force, Royal Netherlands Army and British Army.

Design

The role of the Bushmaster is to provide armoured transport, with infantry dismounting from the vehicle before going into action. As the Bushmaster is only lightly armoured, the term Infantry Mobility Vehicle (IMV) distinguishes it from a heavier wheeled or tracked armoured personnel carrier.

The Bushmaster is optimised for operations in northern Australia, and is capable of carrying up to 10 soldiers and their equipment, fuel and supplies for 3 days, depending on the type of variant. The vehicle is fitted with air conditioning and was once planned to have a drinking water cooling system but was omitted upon production due to cost constraints. After operational complaints the water cooling system is being reconsidered for installation.

The troop carrier variant of the Bushmaster is fitted with one gun ring. The forward gun ring can be fitted with a 5.56, 7.62 or 12.7mm machine gun or a 40mm automatic grenade launcher. The two rear hatches each have a mounting boss to allow the attachment of a swing mount capable to holding a 5.56 machine gun.

The Bushmaster is a mine protected vehicle and provides a high degree of protection against land mines, using its v-hull monocoque to deflect the blast away from the vehicle and its occupants. The vehicle's armour

provides protection against small arms of up to 7.62mm calibre. The Bushmaster is air transportable in C-130 Hercules and C-17 Globemaster III aircraft.



Variants

Six Bushmaster variants are in production for the Australian Army and Royal Australian Air Force. These variants are:

- Troop variant
- Command variant
- Assault Pioneer variant
- Mortar variant
- Direct Fire Weapons variant
- Ambulance variant

The Troop variant being used by the Royal Australian Air Force differs from the Army variant in that it is fitted with 10 seats for infantry and a third weapon mount.[2]

Thales Australia has developed a civilian fire fighting variant of the Bushmaster called the FireKing and a military cargo carrying variant called the Armoured Combat Support Vehicle.[3]. Thales Australia is continuing to develop new Bushmaster variants for example the Copperhead ACSV (Armoured Combat Support Vehicle).

According to the Australian National Audit Office, unit price for Bushmasters in 2000 differed slightly between variants, ranging from A\$562,878 for the troop carrier variant and A\$589,182 for the ambulance variant.[4]

The Bushmaster in Australian service

In keeping with the vehicle's role and capabilities, the Australian Army designates Bushmaster equipped infantry units as being motorised, and not mechanised. Following the vehicle's troubled development, a total of 299 Bushmasters were ordered by the Wheeled Manoeuvre Systems Program Office of the Defence Materiel Organisation for the Australian Defence Force (reduced from the 370 which were originally ordered).

Bushmaster deliveries began in 2005 (three years later than was originally scheduled) and are scheduled to be complete in July 2007. Deliveries of the troop carrier variant (152 vehicles) were completed on 7 June 2006. Deliveries of the command variant are expected to be completed by mid-2006 followed by the delivery of the other variants.

In December 2006 the Australian Minister for Defence announced that the Australian Bushmaster order has been increased and over 400 vehicles will be delivered. This figure was confirmed as 443 vehicles in a subsequent press release. In August 2007 an additional 250 were ordered.

The Australian Defence Force's original order of Bushmasters was broken down into the following configurations.

- 152 troop vehicles
- 72 command vehicles
- 21 assault pioneer vehicles
- 23 mortar vehicles
- 23 direct fire weapons vehicles
- 14 ambulance vehicles

The South Australian Forestry Corporation (ForestrySA) has ordered 15 FireKings. Deliveries of the FireKing to ForestrySA were completed in November 2005. The majority of Australia's Bushmasters are to be allocated to the Army, though 12 are operated by the Royal Australian Air Force's Airfield Defence Guards.

The Bushmaster will be operated by the following Army units:

- B Squadron, 3rd/4th Cavalry Regiment, (3 Brigade)
- 5th Battalion, Royal Australian Regiment (support elements only), (1 Brigade)
- 7th Battalion, Royal Australian Regiment (support elements only), (1 Brigade)
- 6th Battalion, The Royal Australian Regiment, (7 Brigade)
- 7th Combat Service Support Battalion, (7 Brigade)
- 12th/16th Hunter River Lancers (one squadron), (Army Reserve unit)
- Combat Arms Training Centre
- Army Logistic Training Centre

The 8th/9th Battalion, Royal Australian Regiment is to receive the extra Bushmasters ordered in December 2006 after raising in 2008.[13]

The Bushmaster is operated by the RAAF's Airfield Defence Squadrons:

Each ADS is equipped with six Bushmasters

- No. 1 Airfield Defence Squadron
- No. 2 Airfield Defence Squadron

The Motorised Combat Wing of the Army's Combat Arms Training Centre provides initial training to Army and Air Force Bushmaster drivers. Maintenance training is provided by the Army Logistic Training Centre. To date, Australia's Bushmasters have been deployed on five operations:

- Two prototypes were deployed to East Timor in 1999 for trials and VIP protection.
- Ten Bushmasters were deployed to Iraq with the Al Muthanna Task Group in May 2005. This force has been redesignated Overwatch Battle Group (West) and operated 19 Bushmasters in September 2006.
- A small number of Bushmasters have been attached to the Australian Special Forces Task Group in Afghanistan since its re-deployment in September 2005.
- A Company, 6th Battalion, Royal Australian Regiment was equipped with Bushmasters during its role as the security response force for the 2006 Commonwealth Games.
- The Reconstruction Task Force deployed to Afghanistan in August 2006 is equipped with a number of Bushmasters. Reconstruction Task Force 2, which took over the deployment of the Force deployed in 2006 is also equipped with Bushmasters from B Squadron 3rd/4th Cavalry Regiment.

While a full independent assessment of how well the Bushmaster has performed on these deployments is not yet available, Australian Department of Defence press releases and the Army's service newspaper have stated that the vehicles have proven successful. The Bushmaster's high degree of crew and passenger comfort has apparently been particularly appreciated in Iraq.[16]

In September 2006 the Australian Department of Defence announced that it was modifying its fleet of Bushmasters in response to criticisms from Australian soldiers in Iraq and Afghanistan. These criticisms include concerns that the Bushmaster's gunner is exposed to enemy fire and the absence of a drinking water cooling system.[17] The modifications will include fitting a CROWS remote weapon system to at least some Bushmasters and developing an improved water cooling system.[18][19] The protected weapons stations were installed to vehicles deployed to Iraq and Afghanistan in early 2007. The installation team comprised staff from Project Bushranger and the Army and was conducted in theatre.



Specifications:

Type:	MRAP Cat. II
Place of origin:	Australia
Service history:	Used by Australian Army, Royal Australian Air Force, Royal Netherlands Army, South Australian Forestry Corporation
Wars:	Iraq War, Afghanistan, East Timor Production history
Designer	Australian Defence: Industries
Manufacturer	Perry Engineering
Unit cost	A\$562,878-A\$589,182
Produced	2004-present
Number built	~750
Weight	12.4 tonnes (empty)
Length	7.18 m
Width	2.48 m Height 2.65 m
Crew	1 (plus up to 9 passengers)
Armor	'exceeds STANAG 4569 level 1', Monocoque hull

Primary armament	Gun ring for 5.56mm and 7.62mm machine guns or a remote weapon station
Secondary armament	Two additional weapon mounts
Engine	Caterpillar 3126E engine 330 hp (246 kW)
Power/weight	26.4 hp/tonne
Suspension	4x4 double wishbone independent
Operational range	800km Speed Over 100 km/h



LONG RANGE PATROL VEHICLES (LRPV)



The Australian SAS relied heavily of their Long Range Patrol Vehicles (LRPV) and Recon Surveillance Vehicles (RSV) to move around in the AO due to the lack of helo support.

<http://www.specialoperations.com/Foreign/Australia/SASR/afghanistan.htm>

Introduction

The six wheel drive *long range patrol vehicle* (LRPV) is powered by the Isuzu 3.9L 4-cylinder turbo-diesel of the 6x6 Land Rover Perentie family. It carries a 250cc motor-cycle at the rear for scouting work. There is a machine gun mount in the rear and a second forward-facing gun mount can be used if the windscreen is lowered or removed. A spare wheel is carried on each side of the vehicle, neatly recessed into the bodywork. The doors have been deleted.

General

There are some 27 LRPVs in service predominantly with the Special Air Service Regiment. The vehicle has an Isuzu turbo charged 3.9litre engine, front coil springs and springs at the rear. The vehicle has a mount for a 250cc trail bike on the back.

The vehicle is normally armed with a MINIMI and an FN Mag 7.62mm machine guns and has several fuel tanks for long range patrols. The rear machine gun position is being changed to a gun ring as opposed to the earlier pedestal mount. The original pedestal mount had two ammunition box holders, one for 7.62mm ammo and the other for a larger box for what most probably was .50 calibre munitions.. There was a publicity photo that showed the vehicle armed with a 30mm ASP cannon (available for Italeri) on the rear pedestal position.

The JRA LRPV is slightly wider than older Land Rovers including the Land Rover 110., and of course longer in the 6x6 configuration. (lwxh:6001x1980x2050mm). The width is over the front fenders.

LRPV replacement: Nary SOV

The replacement vehicle for SASR's Afghanistan and Iraq workhorse, the Long Range Patrol Vehicle (LRPV) is to be named in honour of SASR Warrant Officer Class 2 David Nary who was killed in an accident during mission rehearsals on 06 November, 2005. The Nary SOV will replace Special Operations Command – Australia's aging fleet of Land-Rover based LRPVs. It will provide greater payload capacity with stronger drive-train, transmission and suspension components and provide an enhanced suite of command, control and communications equipment. **Mercedes Benz G-Wagen?**



JP 2097 Phase 1 - REDFIN (Enhancements to Special Operations Capability - Land Mobility Aspects)

JP 2097 (Redfin) Phase 1 seeks to enhance the ADF Special Operations capability and will introduce a range of specialised vehicles for Special Operations Command (SOCOMD) mobility requirements. The Special Forces (SF) mobility component of the capability consists of a range of combat and support vehicles for various special forces missions conducted by the Special Air Services Regiment (SASR) and the 4th Battalion (Commando), Royal Australian Regiment [4 RAR (Cdo)].

Phase 1A is the accelerated procurement of a replacement for the SASR's Long Range Patrol Vehicle (LRPV) with a new Special Operations Vehicle (SOV) to be designated the 'Nary'. For reasons of operational urgency, the Minister for Defence has approved the sole-source acquisition of 31 vehicles from UK-based company Supacat Limited with an on-board management and communications system to be supplied and integrated by the US-based company Tactronics to satisfy the required SOV capability. An initial operational capability of eight vehicles is to be available from September 2008.

SASR



Photo: Wikipedia. An SAS patrol occupies a low-lying position to remain undetected by passing Iraqis. Patrols observing enemy movements could quickly call on the support of these vehicles if required.

Introduction, Australian Special Air Service Regiment

The Special Air Service Regiment (SASR) is a Special Forces regiment modelled on the original British SAS and also drawing on the traditions of the Australian World War II 'Z' Special Force commando unit, as well as the Independent Companies which were active in the South Pacific during the same period. It is based at Campbell Barracks, Swanbourne, Perth, Western Australia and is a unit of the Royal Australian Infantry Corps, part of the Australian Defence Force. As with the British SAS, the regimental motto is 'Who dares wins'.



Nickname Gerbils, Chicken stranglers
Garrison/HQ Swanbourne, Western Australia

Role

The SASR currently has two primary roles, reconnaissance and counter-terrorism. They also are responsible for surgical direct-action missions, while the 4th Battalion, Royal Australian Regiment (4 RAR) conducts large-scale raids and provides cordons for SASR direct action missions, much like US Rangers support Delta Force operations.

Reconnaissance

In the reconnaissance role the SASR typically operates in small patrols which have the task of infiltrating enemy-held territory and providing intelligence on enemy troop movements. In this role the SASR generally seeks to avoid directly engaging enemy units, though SASR soldiers will call in air and other support to destroy

enemy units whenever possible. SASR reconnaissance patrols can be inserted by air, land or sea (including by submarine) and have proven capable of covering large distances in jungle and desert terrain.

Counter-terrorism and Special Recovery

In the counter-terrorism and special recovery roles the SASR specialises in tasks such as direct action and hostage rescue, including boarding moving ships (ship underway). In contrast with the SASR's reconnaissance role, when operating in the counter terrorism role SASR units are only tasked with the mission statement "to rescue the hostages". The SASR provides Tactical Assault Group (West), with the 4th Battalion, Royal Australian Regiment (Commando) providing Tactical Assault Group (East).

In contrast with this TAG (WEST) assumes additional roles in which TAG (EAST) does not. TAG (WEST) is responsible for special recovery operations outside of Australia, whereas TAG (EAST) provides a domestic counter-terrorist capability.

The SASR's three 'sabre squadrons' rotate between the war/reconnaissance and Counter-Terrorism/Recovery roles. Two squadrons are maintained in the war/reconnaissance role with the remaining squadron filling the Counter-Terrorism/recovery role.[3]

Rotations occur every 12 months, so each squadron fulfills the counter-terrorism/recovery role and configuration every three years.

- * Training Squadron
- * Base Squadron
- * 152 Signal Squadron
- * 3 Sabre Squadrons (1, 2 and 3 Squadron) -each of which contains 5 troops
 - o Headquarters (Smaller than the other Troops)
 - o Airborne
 - o Amphibious
 - o Vehicle Mounted
 - o Signals (contains Signallers which are assigned to the 5 Man Patrols)

The Regiment is organised into three 'sabre' squadrons, each of up to 100 'beret qualified' operators, and an embedded signal squadron (152 Signal squadron), logistic support squadron, and Operational Support Squadron, which conducts the selection and training courses.[18] Only a small percentage of the Regiment are 'beret qualified' operators. The majority of the regiment personnel are highly trained specialist staff who are posted to the unit to provide support for all operations. These include signallers, mechanics and technicians, medical staff, store men, and various specialists. 'Beret qualified' SASR members are known as 'Operators' and support staff are affectionately known as 'Blackhats', due to the dark blue berets they wear. Infantry soldiers who are posted to the unit as store men, drivers, clerks etc wear the dark 'rifle' green Infantry Corps beret.

There are also a number of support personnel who are qualified to wear the sandy beret but have chosen or been directed to remain serving in their particular specialist field. There are also beret qualified members who have been injured and subsequently moved into a support related area.

Signals Corps personnel undertake the same selection and reinforcement cycle training as the rest of the Army, but are rarely released for Corps transfer to Infantry due to the requirement to provide SAS qualified Corps signallers to the Regiment. Personnel from 152 Signal Squadron are encouraged to attempt selection, but as a rule, if successful they remain in the signal squadron and do not transfer into a 'Sabre' squadron. However, in being 'Beret' qualified, they receive a significant pay rise and increased posting longevity to SASR. Members of 152 Signal Squadron are affectionately known as 'Chooks' and are often fully integrated into the 5 man SASR patrols. One member of 152 Signal Squadron was awarded an Infantry Combat Badge during service with the "Gerbils" in Somalia. This was made on the basis that he held an Infantry Employment Code Number (ECN 353 SASR Trooper) and was deployed as part of an SASR team.

Basic patrol weapons are the M4 Carbine (designated M4A5 in Australia) with M203A1 40mm grenade launcher and F89 Minimi Para light machine gun. Another popular patrol weapon is the 7.62mm SR-25 rifle.

The main pistol used in the CT role is the Heckler & Koch USP, in wartime roles however it is usually the ADF's standard issue defence sidearm, the Browning Hi-Power that operators will carry. Many other weapon systems are used as the mission dictates. Up to a third of SASR operators are qualified snipers. Operators are multi-skilled and all are parachute-qualified, but they specialise in either Air, Water or Vehicle-mounted insertion methods.

M4A5 CARBINE



Introduction

The M4 Carbine is a family of firearms tracing its lineage back to earlier carbine versions of the M16, all based on the original AR-15 made by ArmaLite. It is a shorter and lighter version of the M16A2 assault rifle, achieving 80% parts commonality with the M16A2.[1] The M4 has selective fire options including semi-automatic and three-round burst (like the M16A2), while the M4A1 has a "full auto" option in place of the three-round burst.

Specifications

Weight	5.9 lb (2.7 kg)
Empty	6.9 lb (3.1 kg) with 30 rounds
Length	33 in (838 mm) (stock extended)
	29.8 in (757 mm) (stock retracted)
Barrel length	14.5 in (368 mm)
Cartridge	5.56x45mm NATO
Action	Gas-operated, rotating bolt
Rate of fire	700–950 round/min cyclic
Muzzle velocity	2,900 ft/s (884 m/s)
Feed system	Various STANAG Magazines.



The M4 and variants fire 5.56x45mm NATO ammunition and are gas-operated, air-cooled, magazine-fed, selective fire firearms with a 4-position telescoping stock. Original M4 models had a flat-ended telescoping stock, but newer models are now equipped with a redesigned telescoping stock that is slightly larger and the end has a curvature.

As with many carbines, the M4 is handy and more convenient to carry than a full-length rifle. While this makes it a candidate for non-infantry troops (vehicle crews, clerks and staff officers), it also makes it ideal for close quarters combat (CQC), and airborne and special operations. It has been adopted by United States Special Operations Command (USSOCOM) and is the preferred weapon of the U.S. Army Special Forces and Navy SEALs. M4 have also been fielded by the Australian Special Air Service Regiment. Malaysia purchased M4 Carbine service rifles to replace the Steyr AUG service rifles in its armed forces in 2006 and will be manufactured in Malaysia under license by Colt Firearms.[3]

The M4 was developed and produced for the United States government by Colt Firearms, which has an exclusive contract to produce the M4 family of weapons through 2009; however, a number of other manufacturers offer M4-like firearms. The M4, along with the M16A4, has mostly replaced M16 and M16A2 firearms; the U.S. Air Force, for example, plans to transition completely to the M4 Carbine. The M4 has also replaced the M3A1 submachine gun that remained in service (mostly with tank crews). The M4 is similar to much earlier compact M16 versions, such as the 1960s-era XM177 family.

The United States Marine Corps has ordered its officers (up to the rank of lieutenant colonel) and SNCOs to carry the M4 carbine instead of the M9 handgun. This is in recognition that pistols are largely useless in current

conflicts, and is in line with the Marine Corps phrase, "Every Marine a rifleman." United States Navy corpsmen will also be issued M4s instead of the M9, according to the Marine Corps Times.



SOPMOD Block II

A second-generation SOPMOD kit (now known as SOPMOD II) is currently under development, with many different manufacturers competing for a contract. Notable bidders include Knight's Armament Company, Atlantic Research Marketing Systems (ARMS), and Lewis Machine & Tools. Daniel Defense has won the contract for the RIS-II, the next generation of rail handguards.

Variants of the carbine built by different manufacturers are also in service with many other foreign special forces units, such as the Australian Special Air Service Regiment (SASR). While the SASR uses weapons of essentially the same pattern built by Colt for export (Colt uses different models to separate weapons for the U.S. military and those for commercial/export purposes), the British SAS uses a variant on the basic theme, the SFW built by Diemaco of Canada. Although Diemaco was purchased by Colt and renamed Colt Canada, the Diemaco names and related firearms were kept.

M203A1 40MM GRENADE LAUNCHER

M203 is a single shot 40 mm grenade launcher that attaches to the M16 assault rifle or the M4 Carbine used by the military of the United States. Stand-alone variants exist as do versions capable of being used on many other rifles. The device attaches under the barrel and forward of the magazine, the trigger being just forward of the rifle magazine. The rifle magazine functions as a hand grip when firing the M203. A separate sighting system is added to rifles fitted with the M203, as the rifle's standard sights are not matched to the launcher. The M203 can fire high-explosive, smoke, illuminating, buckshot direct fire, High Explosive Dual Purpose, CS gas, and training grenades.



Loading an M203 attached on an M16A1 rifle. The grenade's blue tip and white body shell indicate it is a practice round.

Specifications

- | | |
|---------------------------------------|--|
| • Launcher: | 3 pounds (1.36 kilograms) |
| • Rifle (M16A2): | 8.79 pounds (3.99 kg) |
| • Total weight (including 30 rounds): | 11.79 pounds (5.35 kg) |
| • Bore diameter: | 40 mm |
| • Maximum effective range: | Area target: 1148 feet (350 meters)
Point target: 492 feet (150 meters) |
| • Maximum range: | 1312 feet (400 meters) |
| • Minimum safe range: | Non-Direct Fire: 115 feet (35 meters)
Training: 427 feet (130 meters) |
| • Combat: | 102 feet (31 meters) |
| • Unit Replacement Cost: | \$601 (USD) (2005) |

FN MINIMI



Introduction

The Minimi (short for French: Mini Mitrailleur; “Mini machine gun”) is a Belgian 5.56 mm light machine gun developed by the Fabrique Nationale (FN) company in Herstal by Ernest Vervier. First introduced in 1974, it has entered service with the armed forces of several countries, among them: Australia, Belgium, France, Canada, Italy, Indonesia, Malaysia, New Zealand, Thailand, Sweden, the United Kingdom and the United States (as the M249 SAW). The weapon is currently manufactured at the FN facility in Herstal as well as being license-built in Australia, Canada and the USA (by FN Manufacturing LLC). The Minimi is configured in several variants, the standard model (as a platoon or squad support weapon), the Para version (for use with armored vehicle crews, helicopter pilots and parachute infantry) and the vehicle model (as secondary armament for fighting vehicles).

Specifications

Weight	6.85 kg (15.1 lb) (standard model)
	6.56 kg (14.5 lb) (Minimi Para)
	5.32 kg (11.7 lb) (vehicle model)
	8.17 kg (18.0 lb) fixed stock (Minimi 7.62)
	8.4 kg (19 lb) telescopic metal stock (Minimi 7.62)
Length	1,040 mm (40.9 in) (standard model)
	914 mm (36.0 in) stock extended / 766 mm (30.2 in) stock collapsed (Minimi Para)
	793 mm (31.2 in) no buttstock (vehicle model)
	1,015 mm (40.0 in) fixed stock (Minimi 7.62)
Barrel length	1,000 mm (39.4 in) stock extended / 865 mm (34.1 in) stock collapsed (Minimi 7.62)[1]
	465 mm (18.3 in) (standard model)
	349 mm (13.7 in) (Minimi Para)
Width	502 mm (19.8 in) (Minimi 7.62)
	128 mm (5.0 in) (Minimi 7.62)
Cartridge	5.56x45mm NATO
	7.62x51mm NATO (Minimi 7.62)
Action	Gas operated, rotating bolt
Rate of fire	700-1150 rounds/min
	680-800 rounds/min (Minimi 7.62)
Muzzle velocity	925 m/s (3,035 ft/s) (standard model)
	866 m/s (2,841.2 ft/s) (Minimi Para)
Effective range	300-1000 m sight adjustments
Feed system	200-round M27 disintegrating-link belt, 30-round STANAG magazine
Sights	Rear aperture, front post

General Information

The Minimi is an air-cooled automatic weapon, capable of fully automatic fire only that uses a gas piston operating system with a long stroke piston. The barrel is locked with a rotary bolt, equipped with two massive locking lugs, forced into battery by camming guides in the bolt carrier. Upon firing, the piston is forced to the rear by expanding propellant gases bled from ports in the barrel near the muzzle end. The piston rod acts against the bolt carrier, which begins its rearward motion guided on two rails welded to the receiver walls, while the bolt itself remains locked. This sequence provides a slight delay that ensures chamber pressure has dropped to a safe level by the time a cam in the bolt carrier rotates and unlocks the bolt, increasing extraction reliability as the empty cartridge casing has had the time to cool down and contract, exerting less friction on the chamber walls. The Minimi fires from an open bolt, which eliminates the danger of a round cooking off after extended periods of continuous fire, since a cartridge is only momentarily introduced into the chamber prior to ignition, and the movement of the bolt and bolt carrier forces air through the chamber and barrel after each shot, ventilating the barrel and slowing heating. Gas escaping the gas cylinder is directed upward, avoiding kicking up dust and debris that would reveal the shooter's position. The Minimi has a manually-adjustable gas regulator with two positions, normal and adverse. The adverse setting increases the cyclic rate from 700-850 rounds/min to 950-1150 rounds/min and is used only in extreme environmental conditions or when heavy fouling is present in the weapon's gas tube. The spring extractor is located inside the bolt, while the tilting lever ejector is contained inside the receiver housing. Spent casings are removed through a port located at the forward, bottom right side of the receiver, which is protected with a dust cover. The Minimi is striker-fired and the bolt carrier functions as the striking mechanism.

The weapon is fed from the left-hand side by disintegrating-link M27 ammunition belts, a miniaturized version of the 7.62 mm M13 belt), from either an unsupported loose belt, enclosed in an ammunition box with a 200-round capacity, made of a synthetic polymer) attached to the base of the receiver, or from detachable STANAG magazines, used in other NATO 5.56 mm assault rifles such as the M16 and FNC. Magazine feeding is used only as an auxiliary measure, when belt-linked ammunition has been exhausted. The ammunition belt is introduced into the feed tray, magazines are seated inside the magazine port at a 45° angle, located under the feed tray port. When a belt is placed in the feed tray it covers the magazine port. Likewise, a magazine inserted into the magazine well will prevent the simultaneous insertion of a belt. The magazine port, when not in use, is closed with an L-shaped hinged flap equipped with a tooth, which engages a corresponding opening in the magazine and serves as a magazine release. This innovative feature was developed by FN's Maurice V. Bourlet and allows the Minimi to pass instantaneously from belt feed to magazine feed without any modification. The pawl-type feeding mechanism is modeled on the system used in the MAG general purpose machine gun, which borrows from the WWII-era MG42. The belt is moved in two stages during both the forward and rearward movement of the reciprocating bolt carrier, which provides for a smooth and continuous feeding process. The feeding mechanism top cover features a device that indicates the presence of a cartridge in the feed path.

The Minimi has a push-button type manual safety installed in the trigger housing, above the pistol grip. In the "weapon safe" position, it disables the sear mechanism; pushing the button to the right side exposes a red-colored rim on the left side of the firearm and indicates the weapon is ready to fire. The black polymer pistol grip was initially copied directly from the FAL and FNC rifles, currently a modified grip with lateral grooves is used, installed at a smaller angle to the receiver.

The barrels used in the Minimi have an increased heat capacity for sustained fire, feature a chrome-lined rifled bore (6 right-hand grooves) and are manufactured in two versions: with a 178 mm (1:7 in) twist rate used to stabilize the heavier Belgian 5.56x45mm SS109 cartridge, or a 305 mm (1:12 in) twist for use with American M193 ammunition. The barrels have a quick-change capability; a lever is provided on the left side of the weapon that releases the barrel from its trunnion. A carrying handle is also fixed to the barrel and assists in the barrel change process. A trained soldier will be able to perform a barrel change and ready the weapon for aimed fire in only 6-7 seconds. Early versions of the Minimi had a flash suppressor with side ports as seen on the FNC, CAL and FAL rifles; new production guns have a shorter, cone-shaped slotted flash suppressor.

The standard light machine gun version has a 465 mm (18.3 in) barrel and a skeletonized aluminum stock with a folding wire shoulder strap. The shortened Para model has a 349 mm (13.7 in) barrel and a collapsible metal stock, while the vehicle-mounted model has a 465 mm (18.3 in) barrel but does not have a stock or iron sights.

The Minimi features a welded receiver made from stamped steel. Both the standard and Para variants are equipped with a fixed, folding bipod mounted to the gas tube and stowed under the handguard. The bipod can be adjusted in height and each leg has three height settings. The bipod also offers a 15° range of rotation to either side. With the bipod fully extended, the bore axis is elevated to a height of 465 mm (18.3 in). The

Minimi can also be fired from the Belgian FN360° tripod or the American M122 mount using an M60 pintle. The vehicle-mounted Minimi is fitted with an electrically-powered trigger that enables it to be fired from within an armored fighting vehicle.

Both the standard and Para models come with a rear sight, adjustable for windage and elevation, that provides a peep aperture for ranges from 300 to 1000 m in 100 m increments. The hooded front sight is installed in a post on the gas block and is also adjustable for elevation and windage. Early models of the Minimi had the rear sight mounted forward of the feed cover and the front post secured to the barrel, closer to the muzzle end. An adapter can also be used that allows the use of standard NATO night and day sights. Standard equipment supplied with the Minimi consists of: three ammunition boxes with a 200-round capacity each, a cleaning kit stored inside the forearm, lubricant bottle, sling and blank-firing adaptor.

Australian Usage

esignated F89 in Australian service. The Australian Army, the Royal Australian Navy and the Royal Australian Air Force use a locally built (ADI) version of the Minimi. It is essentially the same as the standard model, but fitted with a MIL-STD-1913 Picatinny rail and the same 1.5x magnification optical sight as used on the F88 rifle. It also has a longer flash suppressor (identical to the one used on the FN MAG), as well as a hydraulic buffer to maintain a consistent rate of fire whether in the normal or adverse gas settings (initial shipments did not have the hydraulic buffer installed, leading to premature fatigue of the firing mechanism when on the extreme gas setting due to the increase in the rate of fire from 700 rounds/min to 1000 rounds/min). There is no heat shield and the carrying handle is fixed, not folding. Each F89 comes with two live barrels and one blank-firing barrel. The gunner will normally carry the spare barrel in the field. Two F89s are carried in each nine-man infantry section. Small numbers of the Minimi Para are used by Australian paratroopers and special forces, these weapons do not have the hydraulic buffer installed. Recent modifications to the F89 include a fixed optical sight similar to that of the F88 Austeyr.



SR-25 (STONER RIFLE-25)



Wikipedia: Sniper Rifle fitted with sound moderator.

Introduction

The SR-25 (Stoner Rifle-25) is a semi-automatic sniper rifle designed by Eugene Stoner and made by Knight's Armament Company. The SR-25 uses a rotating bolt and a direct impingement gas system. It is loosely based on Stoner's AR-10 (and therefore on the AR-15/M16), rebuilt in its original 7.62x51mm NATO caliber. Up to 60% of parts of the SR-25 are interchangeable with the AR15/M16 - everything but the receiver, the hammer, the barrel assembly and the carrier/bolt. SR-25 barrels were originally manufactured by Remington Arms with its famous 5R (5 grooves, rounded) rifling, with twist 1:11.25 (1 turn in 11.25" (286 mm)). The heavy 24" (609 mm) barrel is free-floating, so handguards are attached to the front of the receiver and do not touch the barrel.

Specifications

Weight	Match Rifle 4.88kg, LwMatch 4.31kg, Carbine 3.52kg, Sporter 3.97kg
Length	1118 mm
Barrel length	Match Rifle 24" (610 mm) (also LwMatch & Sporter 20" (508 mm), Carbine 16" (406 mm))
Cartridge	7.62x51mm NATO
Action	Gas-operated, rotating bolt
Feed system	5, 10 and 20-round detachable box magazine

STEYR AUG



Introduction

The AUG is an Austrian 5.56 mm assault rifle, designed in the early 1970s by Steyr Mannlicher GmbH & Co KG (formerly Steyr-Daimler-Puch). The AUG (Armee Universal Gewehr - "universal army rifle") was adopted by the Austrian Army as the StG 77 in 1977, where it replaced the aging 7.62 mm StG 58 automatic rifle (a license-built FN FAL).[1] In production since 1978, it is the standard small arm of the Austrian Bundesheer and various police units. It has also been adopted by the armed forces of Argentina, Australia (accepted into service in 1985 and manufactured by Australian Defence Industries in Lithgow, this Austeyr model is also in use by New Zealand), Bolivia, Ecuador (1988), Ireland, Luxembourg, Saudi Arabia, Tunisia (introduced in 1978), Pakistan and since 1988, the U.S. Immigration and Customs Enforcement agency.

Specifications

Weight	3.6 kg (7.9 lb) (standard rifle)
	3.3 kg (7.3 lb) (carbine)
	3.2 kg (7.1 lb) (subcarbine)
	3.9 kg (8.6 lb) (LMG)
	3.3 kg (7.3 lb) (SMG)
Length	790 mm (31.1 in) (standard rifle)
	690 mm (27.2 in) (carbine)
	630 mm (24.8 in) (subcarbine)
	900 mm (35.4 in) (LMG)
	665 mm (26.2 in) (SMG)
Barrel length	508 mm (20.0 in) (standard rifle)
	407 mm (16.0 in) (carbine)
	350 mm (13.8 in) (subcarbine)
	621 mm (24.4 in) (LMG)
	420 mm (16.5 in) (SMG)
Height	275 mm (10.8 in)
	266 mm (10.5 in) (SMG)
Cartridge	5.56x45mm NATO
	9x19mm Parabellum (SMG)
Action	Gas-operated, rotating bolt
Rate of fire	680–850 rounds/min
Muzzle velocity	940 m/s (3,084 ft/s) (standard rifle)
Effective range	Sighted for 300 m
Feed system	30 or 42-round box magazine
Sights	Swarovski 1.5x telescopic sight, back-up iron sights

The AUG was designed as a family of rifles that could be quickly adapted to a wide variety of roles with the change of the barrel to a desired length and profile, among which are: a compact 350 mm (13.8 in) barrel, 407 mm (16.0 in) carbine barrel, 508 mm (20.0 in) standard rifle-length barrel, and 621 mm (24.4 in) light machine gun barrel.[2] The AUG is a modular, bullpup configuration rifle that employs a high level of synthetic and advanced alloy components.

The primary variant of the rifle designated the AUG A1, consists of six main assemblies: the barrel, receiver with integrated telescopic sight, bolt and bolt carrier, trigger mechanism, stock and magazine. The AUG is a selective fire rifle with a gas piston operated action that fires from a closed bolt. The rotating bolt features 7 locking lugs and is unlocked by means of a stud on the bolt body and a recessed camming guide in the bolt carrier's surface. The bolt carrier itself is guided by two rods inside the receiver with two recoil springs directly behind it, around the two spring guides. The bolt contains both a claw extractor and a casing ejector. The firearm uses a short-stroke piston system (the right guide rod serves as the action rod, transmitting the rearward motion of the gas-driven piston to the bolt carrier), a 3-position gas valve (the first setting is used for normal operation, the second setting - fouled conditions while the third, closed position is used to launch rifle grenades), a two-stage trigger (pulling the trigger halfway produces semi-automatic fire, pulling the trigger all the way to the rear produces fully automatic fire) and a safety mechanism (cross-bolt, button type), located above the grip. In its "safe" position the trigger is mechanically disabled. Some versions have an ALO or "automatic lockout", a small projection at the base of the trigger. In the exposed position the ALO stops the trigger being squeezed past the single shot position. If needed, the ALO can be pushed up to permit automatic fire.



The rifle is fed from translucent, double-column box magazines (molded from a high-strength polymer) with a 30-round capacity and an empty weight of 130 g (4.6 oz). The light machine gun version of the AUG uses an extended 42-round magazine.

The quick-change barrels used in the AUG series are cold hammer forged for increased precision and durability, their bores and certain components of the gas system are chrome plated. The barrels all have 6 right-hand grooves and a rifling twist rate of 228 mm (9.0 in). They lock into a steel insert inside the receiver via eight lugs and are equipped with folding, vertical grips that help to pivot the barrels out during changing. The most compact of the barrels has a fixed vertical grip. Flash hiders were used on the 350 mm (13.8 in), 407 mm (16.0 in) and 508 mm (20.0 in) length barrels, whereas the 621 mm (24.4 in) light machine gun barrel received a muzzle device (combination flash suppressor and compensator) and an integral, lightweight folding bipod. Rifles outfitted with 407 mm (16.0 in) and 508 mm (20.0 in) barrels are able to launch rifle grenades. 508 mm (20.0 in) pattern barrels produced for military purposes are also equipped with a bayonet lug. The

manufacturer offers two other 508 mm (20.0 in) barrel configurations: the first – fitted with a fixed, post foresight (used on the standard rifle version with aperture iron sights) and the second type – equipped with a 40 mm M203 grenade launcher that can be used mounted on the standard length rifle or autonomously – as a stand-alone grenade launcher after attaching a shoulder pad to the end of the 5.56 mm barrel.

The receiver housing is a steel-reinforced aluminum extrusion.[2] The cocking handle is located at the left side and is connected with the bolt carrier's left guide rod. The cocking handle has a forward assist feature - alternatively called a "silent cocking device" - used for pushing the bolt shut without recocking the rifle.[2][4] A bolt hold open device locks the bolt carrier assembly back when changing magazines.[4] Integrated with the receiver is a fixed carry handle that contains a 1.5x telescopic sight made by Swarovski.[2] It contains a simple ring reticle with a basic range finder that is designed so that at 300 m (984.3 ft) a 177 cm (5 ft 9.7 in) tall man-size target will completely fill it giving the shooter a relatively accurate method of estimating range. The sights cannot be set to specific ranges or adjusted for windage and are usually zeroed for 300 meters. The rifle also has a back-up iron sight with a rear notch and front blade, located on top of the optical sight housing, used in case of failure or damage to the primary optical sight. In order to mount a wide range of optics and accessories, a receiver with a NATO-standard Picatinny rail and detachable carry handle was also developed. The rifle's stock, made from fiberglass-reinforced polyamide 66, has a pistol grip with an enlarged trigger guard that allows the rifle to be fired with gloves.[2]

The AUG uses the 5.56x45mm NATO cartridge and will stabilize both SS109/M855 and M193 bullets. The rifle is fully ambidextrous (after swapping out the bolt and replacing ejection port covers). A single fire version of the rifle known as the AUG P is available to the civilian and law enforcement markets. It features a shorter, 407 mm (16.0 in) barrel and a modified bolt, carrier and trigger assembly that will only allow semi-automatic fire.

The light machine gun variant can be modified to fire from an open bolt (called the AUG LMG in this configuration). To accomplish this, a modified bolt carrier, striker and trigger mechanism with sear are used. The rifle comes standard with four magazines, a muzzle cap, spare bolt for left-handed shooters, blank-firing adaptor, cleaning kit, sling and either an American M7 or Austrian KCB bayonet.

Based on the AUG, Steyr developed the 9 mm AUG submachine gun that fires the 9x19mm Parabellum pistol cartridge. It is an automatic, blowback-operated model that fires from a closed bolt. Unlike the rifle variants, this SMG has a unique 420 mm (16.5 in) barrel with 6 right-hand grooves at a 250 mm (1:9.8 in) rifling twist rate, ended with a recoil compensator, a slightly different charging handle and a magazine well conversion insert enabling the use of standard 25-round box magazines from the Steyr MPi 81 and TMP submachine guns. A conversion kit used to transform any rifle variant into the submachine gun is also available. It consists of a barrel, bolt, adapter insert and magazine.



An Australian army soldier from the 2nd Battalion, Royal Australian Regiment conducts a foot patrol with the F88 Austeyr.

Australian Usage

- Austeyr F88: The Australian Army's modified version of the Steyr AUG A1, featuring a bayonet lug. The components are built under license at the Australian Defence Industries factory in Lithgow, New South Wales (now known as Thales Australia).
- Austeyr F88C: A carbine version of the Austeyr F88 featuring a shorter, 407 mm (16.0 in) barrel. The F88C is generally used as a personal defensive weapon where maneuverability is an issue, such as in armoured vehicles.
- Austeyr F88S: A version of the Australian Austeyr F88 with an integrated Picatinny rail in place of the standard optic that allows the attachment of various sights (night vision devices, magnified and non-magnified optics such as the ELCAN C79, Trijicon ACOG or Aimpoint).
- F88S-A1C: The Austeyr F88S-A1C is a compact variant of the F88 fitted with a Picatinny rail. The rifle has a 407 mm (16.0 in) barrel. Typically issued to front-line combat infantry units with room and weight constraints such as cavalry, reconnaissance, light horse, paratroopers and airfield defence guards (RAAF).

- Austeyr F88 GLA: Australian Army version with an M203 grenade launcher. It features an Inter-bar (armourer attached) interface, an RM Equipment M203PI grenade launcher, and a Knight's Armament quadrant sight assembly to which a Firepoint red dot sight is attached. The bayonet lugs and forward vertical foregrip are removed.
 - F88T: ADI has developed a .22-caliber training rifle for use by the Australian Army. The rifle provides an economical training alternative, with very low ammunition cost, which can be used in environmentally sensitive training areas and ranges where "overshooting" is an issue, and there is less likely of a chance to injure instructors and other persons[9]. Also used by the Australian Defence Force Cadets.
 - Austeyr F88A4: ADI's proposed F88A4 will incorporate multiple Picatinny rails for the fitting of legacy systems such as the M203P1 40 mm grenade launcher as well as both commercial off-the-shelf (COTS) and military off-the-shelf (MOTS) sighting and battle enhancement accessories. Also it must be noted that the A4 has only been bought in limited numbers (reportedly only 10 units) for evaluation purposes.
 - DSTO Advanced Individual Combat Weapon: Experimental weapon combining the barrel, action and magazine of a Steyr F88 with an enlarged receiver and stock/body that also incorporates a multiple-shot 40 mm grenade launcher.
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M113



M113 Medium Reconnaissance Vehicle in the Puckapunyal Army Camp, Victoria, Australia.

A huge number of M113 Armored Personnel Carrier variants have been created, ranging from infantry carriers to nuclear missile carriers. The M113 Armored Personnel Carrier has become one of the most prolific armored vehicles of the second half of the 20th century, and continues to serve with armies around the world into the 21st century. Not without its faults, the otherwise versatile chassis of the M113 has been used to create almost every type of vehicle imaginable. Few vehicles ever created can claim the application to such a wide range of roles.

* M113 Fire Support Vehicle (FSV) - The M113 FSV was a variant fitted with the turret from the Alvis Saladin armoured car. The FSV was introduced into Australian Army units in the mid-1960s following the withdrawal of the Saladins and was armed with a 76mm gun, a .30 calibre coaxial machine gun and a .30 calibre machine gun mounted on the roof of the vehicle's turret. The M113 was an interim vehicle and was replaced by the M113 Medium Reconnaissance Vehicle in the late 1970s. It was commonly referred to by Royal Australian Armoured Corps crews as the "Beast".

* M113 Fitter - Armoured recovery vehicle with HIAB (Hydrauliska Industri AB) crane on hull roof.

* M113 Light Reconnaissance Vehicle - A standard M113A1 with a the Cadillac Gage T50 turret as used on the V100/V150 series of armored cars, mounting two Browning machine guns, a .30 caliber and a M2 .50 caliber machine gun. While the standard armoured personnel carrier version in Australian service is also fitted with the T50 turret it carries only a .30 caliber machine gun. For a short period of time in Vietnam the Aircraft Armaments Incorporated Model 74C Cupola/Command Station was used, but it was quickly replaced by the T50. Also used by the New Zealand Army until the M113 was replaced in 2005.

- * M113 Medium Reconnaissance Vehicle (MRV) - Australian variant similar to the M113 FSV, but using the turret from the FV101 Scorpion light tank. The MRV replaced the FSV in Australian service.
- * M113AS3 - significantly upgraded M113 with new engine, drive train and brakes.
- * M113AS4 - upgraded to the same standard as the AS3, lengthened to fit an additional road wheel station and fitted with a new Tenix designed one-man turret with a heavy machine gun.



The M113 is an armored personnel carrier family of vehicles in use with the US military and many other nations.

It is a fully tracked vehicle capable of limited amphibious operation in lakes and streams, extended cross-country travel over rough terrain, and high speed operation on improved roads. The M113 family has many variants and modifications that are used in a variety of combat and combat support roles. Approximately 80,000 units of all types have been produced worldwide making it one of the most widely used armored fighting vehicle of all time. [1] Although not a tank, or even designed as a fighting vehicle, the M113 was the most utilized armored vehicle of the Vietnam War[citation needed]. It inspired newer generations of more heavily armored and armed infantry fighting vehicles. Yet it remains in front-line service and production in the 21st century, and the M113 was recently declared the best in a television comparison of "top 10" armored personnel carriers and infantry fighting vehicles.



Specifications

Weight	12.3 tonnes
Length	4.863 m
Width	2.686 m
Height	2.5 m
Crew	2 + 11 passengers
Armor	aluminium 12-38 mm
Primary armament	M2 Browning machine gun
Secondary armament	varies (see text)
Engine	Detroit Diesel 6V53T, 6-cylinder diesel engine 275 hp (205 kW)
Power/weight	22.36 hp/tonne
Suspension	torsion bar, 5 road wheels
Operational range	~480 km (~300 miles)
Speed	66 km/h (41 mph)

M1A1 ABRAMS TANK

59 M1A1 AIM SA tanks were bought to replace the Leopard AS1 in 2007



Introduction

The M1 Abrams is a main battle tank produced in the United States. The M1 is named after General Creighton Abrams, former Army Chief of Staff and commander of the 37th Armored Regiment. It is a well armed, heavily armored, and highly mobile tank designed for modern armored ground warfare.[citation needed] Notable features of the M1 Abrams include the use of a powerful gas turbine engine, the adoption of sophisticated composite armor, and separate ammunition storage in a blow-out compartment for crew safety. It is one of the heaviest tanks in service, weighing in at close to 70 tons.

The M1 Abrams entered U.S. service in 1980, replacing the M60 Patton and M48A5. It did, however, serve for over a decade alongside the improved M60A3, which had entered service in 1978. Three main versions of the M1 Abrams have been deployed, the M1, M1A1, and M1A2, incorporating improved armament, protection and electronics. These improvements, as well as periodic upgrades to older tanks have allowed this long-serving vehicle to remain in front-line service. It is the principal combat tank of the United States Army and Marine Corps, and the armies of Egypt, Kuwait, Saudi Arabia, and as of 2007, Australia.

Armor

Tankers of the 1st Armored Division drive an M1 Abrams tank through the Taunus Mountains north of Frankfurt during Exercise Ready Crucible on February 14, 2005.

Tankers of the 1st Armored Division drive an M1 Abrams tank through the Taunus Mountains north of Frankfurt during Exercise Ready Crucible on February 14, 2005.

The Abrams is protected by Chobham armor, a further development of British "Burlington" armor. Chobham is a composite armor formed by spacing multiple layers of various alloys of steel, ceramics, plastic composites, and kevlar, giving an estimated maximum (frontal turret) 1320-1620 millimeters of RHAe versus HEAT (and other chemical energy rounds) and 940-960 mm versus kinetic energy penetrators.[2] It may also be fitted with reactive armor over the track skirts if needed (as in the Urban Survival Kit) and Slat armor over the rear of the tank and rear fuel cells to protect against ATGMs. Fuel and ammunition are in armored compartments with blowout panels to protect the crew from the risk of the tank's own ammunition cooking off if the tank is damaged. Protection against spalling is provided by a Kevlar liner. Beginning in 1987, M1A1 tanks received

improved armor packages that incorporated depleted uranium (DU) mesh in their armor at the front of the turret and the front of the hull. Armor reinforced in this manner offers significantly increased resistance towards all types of anti-tank weaponry, but at the expense of adding considerable weight to the tank.

The first M1A1 tanks to receive this upgrade were tanks stationed in Germany, since they were the first line of defense against the Soviet Union. US-based tank battalions participating in Operation Desert Storm received an emergency program to upgrade their tanks with depleted uranium armor immediately before the onset of the campaign. M1A2 tanks uniformly incorporate depleted uranium armor, and all M1A1 tanks in active service have been upgraded to this standard as well, the armor thickness believed to be equivalent to 24 inches (610 mm) of RHA. The strength of the armor is estimated to be about the same as similar western, contemporary main battle tanks such as the Leopard 2. The M1A1/M1A2 can survive multiple hits from the most powerful tank munitions (including 120 mm depleted uranium APFSDS) and anti-tank missiles.[citation needed] In the Persian Gulf War, Abrams tanks survived multiple hits at relatively close ranges from Iraqi T-72s and ATGMs. M829A1 "Silver Bullet" APFSDS rounds from other M1A1 Abrams were unable to penetrate the front and side armor (even at close ranges) in friendly fire incidents as well as an incident in which another Abrams tried to destroy an Abrams that got stuck in mud and had to be abandoned.[3]

In addition to the advanced armor, some Abrams, are equipped with a Missile Countermeasure Device that can impede the function of guidance systems of semiactive control line-of-sight (SACLOS) wire and radio guided anti-tank guided missiles (Russian AT-3, AT-4, AT-5, AT-6 and the like) and thermally and infrared guided missiles. (ATGM)[2]. This device is mounted on the turret roof in front of the Loader's hatch, and can lead some people to mistake Abrams fitted with these devices for the M1A2 version, since the Commander's Independent Thermal Viewer on the latter is mounted in the same place, though the MCD is box-shaped and fixed in place as opposed to cylindrical and rotating like the CITV.

On the off chance that the Abrams does suffer damage resulting in a fire in the crew compartment, the tank is equipped with a halon fire-suppression system that automatically engages and extinguishes fires in seconds.

Armament

Main armament

M68A1 rifled gun

The main armament of the original model M1 was the M68A1 105 mm rifled tank gun firing a variety of high explosive anti-tank (HEAT), high explosive, white phosphorus, and a highly efficient and lethal anti-personnel (multiple flechette) round. This gun is a license-built version of the British Royal Ordnance L7 gun. While being a reliable weapon and widely used by both NATO and former Warsaw Pact nations alike, a cannon with lethality beyond the 3 kilometer range was needed to combat newer armor technologies. To attain that lethality, projectile diameter needed to be increased. The M68A1's performance in terms of accuracy and armor-piercing penetration is on par with the M256A1 up to 3000 meters out, but beyond that range the 105mm projectile lacks the kinetic energy to defeat modern armor packages.

M256 smoothbore gun

The main armament of the M1A1 and M1A2 is the M256A1 120 mm smoothbore gun, designed by Rheinmetall AG of Germany. The M256A1 is a variant of the Rheinmetall 120 mm L/44 gun carried on the German Leopard 2 on all variants up to the Leopard 2A5. Leopard 2A6 replaced the L/44 barrel with a longer L/55. The newer M256A1 is manufactured under license in the United States by Watervliet Arsenal, New York.

Rounds like the M829A2 were developed specifically to address the threats posed by a T-90 or T-80U tank, given their high level of protection provided the tanks by kontakt-5 Explosive Reactive Armor, and HEAT shaped charge rounds such as the M830, the latest version of which (M830A1) incorporates a sophisticated multi-mode electronic sensing fuse and more fragmentation which allows it to be used effectively against armored vehicles, personnel, and low-flying aircraft. Unlike the Soviet-built tanks it was designed to go up against, the Abrams uses a manual loader rather than an automatic device, due to the belief that having a

person reload the gun is faster and more reliable. This decision was proven out as the Soviet-era automatic loading system proved troublesome.[citation needed] Also important in the decision to use a crewmember instead of an automatic loader during the XM-1 development was the fact that autoloaders of the day did not allow for separate ammunition storage in the turret like the M1 was developed with.

The new M1028 120 mm anti-personnel canister cartridge was brought into service early for use in the aftermath of the 2003 invasion of Iraq. It contains 1,098 3/8 inch steel ball projectiles which spread from the muzzle to produce a shotgun effect lethal out to 600 m. The steel balls can be used to clear enemy dismounts, break up hasty ambush sites in urban areas, clear defiles, stop infantry attacks and counter-attacks and support friendly infantry assaults by providing cover-by-fire. The Canister round is also a highly effective breaching round and can level cinder block walls and knock man-sized holes in reinforced concrete walls for infantry raids at distances up to 75 meters.

In addition to this, the new MRM-KE (Mid-Range-Munition Kinetic Energy) is also in development. Essentially a cannon-fired guided round, it has a range of roughly 12 km and uses a KE warhead which is rocket assisted in its final phase of flight. This is intended to be the best penetrator yet, an improvement over the US 3rd generation DU penetrator (estimated penetration 790 mm).

Secondary armament

The Abrams tank has three machine guns:

1. A .50 cal. (12.7 mm) M2 machine gun in front of the commander's hatch. On the M1, M1IP and M1A1, this gun is on a powered mount and can be fired using a 3× magnification sight, known as the Commander's Weapon Station (CWS for short), while the vehicle is buttoned up. On the M1A2 & M1A2SEP, this gun is on a flex mount (seen at right), the Commander having to expose himself to fire the weapon manually. With the forthcoming TUSK add-on kit, an M2 or an Mk 19 grenade launcher can be mounted on the CROWS remote weapons platform (similar to the Protector M151 remote weapon station used on the Stryker family of vehicles).
2. A 7.62 mm M240 machine gun in front of the loader's hatch on a skate mount. Some of these have been fitted with gun shields during the ongoing conflict in Iraq as seen in the image at right, as well as night-vision scopes for low-visibility engagements.
3. A second 7.62 mm M240 machine gun in a coaxial mount. The coaxial MG is aimed and fired with the same computer fire control system used for the main gun.

The turret is fitted with two six-barreled smoke grenade launchers (USMC M1A1's use an eight-barreled version). These can create a thick smoke that blocks both vision and thermal imaging, and can also be armed with chaff. The engine is also equipped with a smoke generator that is triggered by the driver. The Abrams also has provisions for storing an M16 rifle or M4 carbine inside the turret in case the crew is required to leave the tank under potentially hostile conditions; while the crewmen are supplied with the M9 Beretta pistol as a personal sidearm.

Aiming

The Abrams is equipped with a ballistic fire-control computer that uses data from a variety of sources, including the thermal or daylight Gunner's Primary Sight (GPS), all computing and displaying one of three components of the ballistic solution - lead angle, ammunition type, and range to the target. These three components are determined using a laser rangefinder, crosswind sensor, a pendulum static cant sensor, data on the ammunition type, tank-specific boresight alignment data, ammunition temperature, air temperature, barometric pressure, a muzzle reference sensor (MRS) that determines and compensates for barrel droop at the muzzle due to gravitational pull and barrel heating due to firing or sunlight, and target speed determined by tracking rate tachometers in the Gunner's or Commander's Controls Handles allowing for target speed input into the ballistic solution.

The fire-control system uses this data to compute a firing solution for the gunner. The ballistic solution generated ensures a hit percentage greater than 95 percent at nominal ranges. Either the commander or

gunner can fire the main gun. Additionally, the Commander's Independent Thermal Viewer (CITV) on the M1A2 can be used to locate targets and pass them on for the gunner to engage while the commander scans for new targets. In the event of a malfunction or damage to the primary sight system, the main and coaxial weapons can be manually aimed using a telescopic scope boresighted to the main gun known as the Gunner's Auxiliary Sight (GAS). The GAS has two interchangeable reticles; one for HEAT and MPAT (MultiPurpose AntiTank) rounds and one for APFSDS and STAFF (Smart Target-Activated Fire and Forget) ammunition. Turret traverse and main gun elevation can be accomplished with manual handles and cranks in the event of a Fire Control System or Hydraulic System failure. The commander's M2 .50 caliber machine gun on the M1 and M1A1 is aimed by a 3x magnification sight incorporated into the Commander's Weapon Station (CWS), while the M1A2 uses either the machine gun's own iron sights, or a remote aiming system such as the CROWS system when used as part of the TUSK kit. The loader's M240 machine gun is aimed either with the built-in iron sights or with a thermal scope mounted on the machine gun.

Mobility

The M1 Abrams is powered by a 1500 hp (1119 kW) Honeywell AGT1500 (originally made by Lycoming) gas turbine, and a six speed (four forward, two reverse) Allison X-1100-3B Hydro-Kinetic Automatic transmission, giving it a governed top speed of 45 mph (72 km/h) on paved roads, and 30 mph (48 km/h) cross-country. With the engine governor removed, speeds of around 60 mph (100 km/h) are possible on an improved surface; however, damage to the drive train (especially to the tracks) and an increased risk of injuries to the crew can occur at speeds above 45 mph (72 km/h). The tank can be fueled with diesel fuel, kerosene, any grade of motor gasoline, JP-4 jet fuel, or JP-8 jet fuel; the US Army uses JP-8 jet fuel in order to simplify logistics. The Royal Australian Armoured Corps' M1A1 AIM SA uses diesel fuel; it is cheaper and makes practical sense for Australian military logistics.

The gas turbine propulsion system has proven quite reliable in practice and combat, but its high fuel consumption is a serious logistic issue (starting up the turbine alone consumes nearly 11 gallons of fuel).[citation needed] The high speed, high temperature jet blast emitted from the rear of M1 Abrams tanks makes it difficult for the infantry to proceed shadowing the tank in urban combat. The turbine is very quiet when compared to diesel engines of similar power output and produces a significantly different sound from a contemporary diesel tank engine, reducing the audible distance of the sound, thus earning the Abrams the nickname, "whispering death" during its first REFORGER exercise. Future US tanks may return to reciprocating engines for propulsion, as 4-stroke diesel engines have proven quite successful in other modern heavy tanks, e.g. the Leopard 2, Challenger 2 and Merkava. The small size, simplicity, power-to-weight ratio, and easy removal/replacement of the turbine powerpack does, however, present significant advantages over any proposed reciprocating replacement.

The Abrams can be carried by a C-5 Galaxy or a C-17 Globemaster III. The limited capacity (two combat-ready in a C-5, one combat-ready tank in a C-17) caused serious logistical problems when deploying the tanks for the First Gulf War, though there was enough time for 1,848 tanks to be transported by ship.

Specifications

Weight	67.6 short tons (61.4 tonnes)
Length	Gun forward: 32.04 ft (9.77 m)
Hull length:	26.02 ft (7.93 m)
Width	12 ft (3.66 m)
Height	8 ft (2.44 m)
Crew	4 (commander, gunner, loader, driver)
Armor	Chobham, RHA
Primary armament	105 mm M68 rifled cannon (M1) 120 mm M256 smoothbore cannon (M1A1, M1A2, M1A2SEP)
Secondary armament	1 x .50-caliber (12.7 mm) M2HB heavy machine gun 2 x M240 7.62 mm machine guns (1 pintle-mounted, 1 coaxial)

Engine	AGT-1500C multi-fuel turbine engine 1500 hp (1119 kW)
Power/weight	24.5 hp/tonne
Transmission	Allison DDA X-1100-3B
Suspension	Torsion bar
Ground clearance	0.48 m (M1, M1A1) 0.43 m (M1A2)
Operational range	465.29 km (289 mi)
With NBC system:	449.19 km (279 mi)
Speed Road:	67.72 km/h (42 mph)
Off-road:	48.3 km/h (30 mph)



THE AUSTRALIAN LIGHT ARMoured VEHICLE (ASLAV)



Nick Dowling ASLAV-25

Introduction

The Australian Light Armoured Vehicle (ASLAV), is an Australian version of the LAV 25 designed and manufactured by General Dynamics Land Systems Canada for the U.S. Marines. The initial design was the Mowag Piranha, however the vehicle was re-designed to meet North American requirements and US Military Standards. It is a highly mobile, eight wheeled amphibious armoured vehicle used for reconnaissance and surveillance operations. The Australian Defence Materiel Organisation acquired 113 of the Australian version of the Canadian manufactured LAV for the Australian Army. By 1997 the 2nd Cavalry Regiment was fully equipped with the ASLAV.

Phase 3 of the ASLAV acquisition was approved with the follow on purchase of 144 vehicles with increased levels of local content including the fabrication and assembly of LAV-25 turrets by General Dynamics Land Systems - Australia. The Wheeled Manoeuvre Systems Program Office of the Defence Materiel Organisation manages the ASLAV Phase 3 project, as well as the through-life support of in-service ASLAV assets.

These vehicles have been issued to training units, and the 2nd Cavalry Regiment. The Phase 2 vehicles have been upgraded and the bulk issued to the 2nd/14th Light Horse Regiment (Queensland Mounted Infantry) in Brisbane. This equips the Army's two armoured reconnaissance units with ASLAVs.

The ASLAV has an eight wheeled configuration (capable of either four or eight wheel drive), is amphibious and has a range of 600 km with a top road speed of 100 km/h.

The ASLAV has excellent battlefield mobility, as all wheels are equipped with a solid-core secondary tyre next to the hub, allowing the vehicle to function even with eight flat tyres.

Phase 3 improvements included a laser range finder, the latest generation thermal imager, 28 V DC electric drive for the turret and improved suspension for the hull. The heat of northern Australia poses special problems for armoured vehicle crews with interior temperatures reaching 55 degrees Celsius (130 °F).



The ASLAV is fitted with air-conditioning that reduces temperatures at the crew positions to outside levels. Increasing the versatility of the ASLAV even more is the use of non-permanent Mission Role Installation Kits (MRIKs) to generate several variants from a single hull design. This is a unique Australian modification and much of the design and development work was done in Australia.

Operational service

ASLAVs have seen operational service with the Australian Army in East Timor, Iraq and Afghanistan.

Variants

By using these MRIKs and the three different hull types of the ASLAV the Australian Army has at their disposal, the following variants have been developed:

- ASLAV-25 (Reconnaissance) - A three man reconnaissance vehicle armed with an M242 dual-feed 25 mm Bushmaster cannon and two 7.62 mm FN MAG 58 machine guns.
- ASLAV-PC (Personnel Carrier) - A two man vehicle armed with a .50 BMG M2 machine gun and capable of carrying 7 scout troops. The standard machine gun pintle mount is replaced by a KONGSBERG PROTECTOR remote weapon station (RWS) which can accommodate either a 12.7 mm machine gun or a Mk19 40 mm automatic grenade launcher.
- ASLAV-C (Command) - A vehicle equipped with enhanced radio installation and radio masts, mapboard, stowage compartments, appropriate seating and annex. Armed with a single .50 caliber BMG M2 machine gun.
- ASLAV-S (Surveillance) - A specialised surveillance vehicle equipped with thermal imager, laser range finder and day television camera. Armed with a single .50 BMG M2 machine gun.
- ASLAV-A (Ambulance) - Equipped with medical equipment and litter stations this ASLAV can carry three lying patients or six sitting patients. Armed with a single .50 BMG M2 machine gun.
- ASLAV-F (Fitter) - Maintenance support vehicle crewed by soldiers of the Royal Australian Electrical and Mechanical Engineers (RAEME) for the repair and maintenance of ASLAV vehicles. Armed with a single 7.62 FN MAG 58 machine gun.
- ASLAV-R (Recovery) - Maintenance support vehicle, also crewed by RAEME soldiers for recovering damaged or bogged vehicles. Armed with a single 7.62 FN MAG 58 machine gun.



Specifications

Weight	13.2 tonnes
Length	6.53 m
Width	2.62 m
Height	2.69 m
Crew	3 + 6 troops
Armor	Unknown
Primary armament	25 mm M242 Chain Gun 720 rounds
Secondary armament	7.62 mm M240C machine gun 1,200 rounds
Engine	Diesel 275 hp (205 kW)
Power/weight	20.83 hp/tonne
Suspension	8 wheel independent
Operational range	660 km or 410 miles
Speed	100 km/h or 62mph



FN MAG



The MAG is a Belgian 7.62 mm general purpose machine gun, designed in the early 1950s at Fabrique Nationale (FN) by Ernest Vervier. It is used in 70 countries, in 25 of those countries it is a standard-issue support weapon, it was produced locally in 6 countries (Argentina, Egypt, India, Singapore, Taiwan, USA and the United Kingdom). The weapon's name is an abbreviation for Mitrailleuse d'Appui General – "General Purpose Machine Gun" (GPMG). The MAG is available in three primary versions: the standard, heavy infantry Model 60-20 machine gun, the Model 60-40 coaxial machine gun for armoured fighting vehicles and the Model 60-30 aircraft variant.

The MAG is officially designated as the MAG-58 within the Australian Defence Force, in particular, the Australian Army. Due to its weight the weapon is usually employed in the Direct Fire Support role mounted on a tripod for accurate sustained fire operations. The MAG-58 is also used as a coaxial and flex-mount machine gun for the ASLAV-25 AFV, and is also fitted to Army Blackhawk helicopters as a defensive weapon operated by the load master. Other vehicle uses of the weapon include the Land Rover Perentie 6x6 infantry mobility vehicles and the Bushmaster IMV vehicle. In recent times the stores of the MAG-58 of the ADF have undergone a complete rebuild replacing all the rivets in the receiver and exchanging L7 GPMG components that had found their way into ADF inventories over the years. Standardizing and refurbishing of the weapon platform allowed for continued operation and logistical support of the machine gun well into the year 2000 and beyond. To date, the MAG-58 remains the primary machine gun of the ADF with no replacement planned.

Specifications

Weight	11.79 kg (25.99 lb)
Length	1,260 mm (49.6 in)
Barrel length	630 mm (24.8 in)w/flash hider
Cartridge	7.62x51mm NATO
Action	Gas-operated

Rate of fire	650-1,000 rounds/min
Muzzle velocity	840 m/s (2,756 ft/s)
Effective range	200 to 1,800 m sight adjustments
Maximum range	1,500 m from tripod
Feed system	Non-disintegrating DM1 or disintegrating M13 linked belt
Sights	Folding leaf sight with aperture and notch, front blade

The MAG Model 60-20 is an automatic, air-cooled, gas-operated weapon that uses ignited powder gases bled through a port in the barrel to propel a gas piston rod connected to the locking assembly (uses a long-stroke piston system). The barrel breech is locked with a vertically-tilting, downward locking lever mechanism that is connected to the bolt carrier through an articulated joint. The locking shoulder and camming surfaces that guide the locking lever are located at the base of the receiver. The MAG uses a series of proven design elements from other successful firearms, e.g. the locking mechanism is modeled on that of the Browning M1918 (BAR) automatic rifle, and the feed and trigger mechanisms are from the WWII-era MG42 universal machine gun.



The MAG fires from an open bolt. Both the spring-powered extractor and ejector are contained in the bolt. After firing, spent cartridge casings are removed through an ejection port located at the base of the receiver (a spring-loaded dust cover of the MG42 type covers the ejection port). The machine gun has a striker firing mechanism (the bolt carrier acts as the striker as it contains a channel that houses the firing pin, which protrudes out from the surface of the bolt upon firing), an automatic-only trigger assembly and a manual cross-bolt push-button safety, which is located above the pistol grip. With the safety placed in the "safe" setting, the sear mechanism is disabled. The safety can only be engaged with the weapon cocked.

The weapon feeds from the left-hand side from open-link, metal ammunition belts: either the American disintegrating M13 belt (NATO standard) or the segmented German DM1 belt, whose 50-round sections can be linked together through a cartridge. In order to adapt the weapon to feed from one belt type to the other, several components of the feed mechanism need to be reconfigured since the position of the feed tray's cartridge stop and pawl angles in the top cover are different. The MAG features a pawl-type feeding mechanism that continues to move the feed link during both the rearward and forward cycles of the reciprocating bolt carrier, producing a smooth belt flow. The feeding mechanism's three pawls are actuated by a roller connected to the bolt carrier. The feed channel rail, feed link, both feed slides and the feed tray are chrome plated. The top cover body is an anodized aluminum casting. In the infantry assault role, the weapon can be fitted with a sheet metal container that houses a 50-round belt and is attached to the left side of the receiver housing.

The quick-change barrel has a slotted flash suppressor. The barrel's chamber and bore are chromium-lined and the barrel has 4 right-hand grooves with a 305 mm (1:12 in) rifling twist rate. Also attached to the barrel is the front sight housing and base, carry handle and gas block (equipped with an exhaust-type gas regulator valve with three settings).

The machine gun is fitted with a folding bipod (attached to the end of the gas cylinder) that cannot be adjusted for height. The aluminum legs can be folded back for carrying or use as a forearm - and secured in slots under the receiver by their hooks and a spring-loaded catch. When firing from the hip, the bipod legs remain extended and the left leg is gripped for support. The bipod can be removed from the gas cylinder by tapping-out a roll pin in the gas cylinder head until it's flush and the bipod can be rotated enough to clear the gas cylinder's retaining lugs. The MAG is also equipped with a fixed wooden stock, pistol grip, carrying handle and iron sights that consist of a forward blade (adjustable mechanically for both windage and elevation) and a folding leaf rear sight with an aperture in the down position for firing distances from 200 to 800 m in 100 m

increments and an open U-notch for ranges from 800 to 1,800 meters in 100 m increments. The rear sight is hinged to a base with protective ears that is integral with the receiver's upper forging.

The MAG's receiver is constructed from sheet metal stampings reinforced by steel plates and rivets. The front is reinforced to accept the barrel nut and gas cylinder which are permanently mounted. Guide rails which support the bolt assembly and piston extension during their reciprocating movement are riveted to the side plates. The bolt's guide rails are shaped downward to drive the locking lever into engagement with the locking shoulder - also riveted to the side plates. The rear of the receiver has been reinforced and slotted to accept the buttstock.



In the static machine gun role the weapon is mounted on a tripod which offers a higher degree of accuracy and control than the bipod, e.g. the FN 360° tripod, which features an elevation adjustment mechanism that enables the weapon's bore axis to be maintained from 300 mm (11.8 in) to 600 mm (23.6 in), has a -30° to +15° elevation change and a 360° traverse range.

The vehicle-mounted variant of the MAG lacks a stock, bipod, carry handle, pistol grip and ejection port dust cover, it does however have a new closed-type gas regulator. Depending on the weapon's employment, the machine gun can also be fitted with an extended charging handle linkage, standard trigger group (with a pistol grip), or a specialized trigger assembly with an electrically-fired trigger.

The pintle-mounted aircraft model is fed from either the right or left-hand side exclusively with the M13 belt. Thus configured weapons typically lack standard iron sights and are equipped with electrically powered triggers.

The MAG fires the 7.62x51mm NATO cartridge. A variant was also produced for the Swedish Army (designated the Ksp 58), that was adapted to use the 6.5x55mm Mauser rifle cartridge.

M252 MORTAR



Introduction

The M252 81 mm medium weight Mortar is an American smooth bore, muzzle-loading, high-angle-of-fire weapon used for long-range indirect fire support to light infantry, air assault, and airborne units across the entire front of a battalion zone of influence. In the US Army and US Marine Corps, it is normally deployed in the mortar platoon of an infantry battalion.

The M252 is an adaptation of the standard British 81 mm mortar, the L16 81mm Mortar developed in the 1970s.

Design

The M252 system weighs 91 lb (41 kg) completely assembled and is composed of the M253 Cannon (35 lb, 16 kg), M177 Mount (27 lb, 12 kg), M3A1 Baseplate (29 lb, 13 kg), and the M64A1 Sight Unit (2.5 lb, 1.1 kg). The mount consists of a bipod and a base plate which is provided with screw type elevating and traversing mechanisms to

elevate/traverse the mortar. The M64A1 sight unit (also used on the M224) is attached to the bipod mount. The M252 is a gravity-fired smooth bore system. Attached to the muzzle of the weapon is the Blast Attenuation Device (BAD), used to reduce the blast effects on the mortar crew. To increase cooling efficiency, the breech end is finned. The cannon also has a crew-removable breech plug and firing pin.

History

The M252 entered service with the US Army in 1987 and replaced the previous Marine Corps 81 mm mortar in 1986. It was adopted due to the extended range (from 4,500 meters to 5,650 meters) and lethality compared to the previous 81 mm mortar (the M29). In the U.S. it is produced by Watervliet Arsenal.

Operation

The M252 uses a crew of five enlisted personnel to operate: the squad leader, the gunner, the assistant gunner, the first ammunition bearer, and the second ammunition bearer.

1. The squad leader stands directly behind the mortar where he can command and control his squad. In addition to having general oversight of all squad activities, he also supervises the emplacement, laying, and firing of the weapon.

2. The gunner stands to the left of the mortar where he can manipulate the sight, traversing handwheel, and elevating handwheel. He places firing data on the sight and lays the mortar for deflection and elevation. He makes large deflection shifts by shifting the bipod assembly and keeps the bubbles level during firing.

3. The assistant gunner stands to the right of the mortar, facing the barrel and ready to load. In addition to loading, he swabs the bore after 10 rounds have been fired or after each fire mission. The assistant gunner is the person that actually fires the weapon.

4. The first ammunition bearer stands to the right rear of the mortar. He has the duty of preparing the ammunition (charge settings, fuzes, etc...) and passing it to the assistant gunner.

5. The second ammunition bearer stands to the right rear of the mortar behind the ammunition bearer. He maintains the ammunition for firing and provides local security for the mortar position.

Types of Rounds

While the M252 does fire a weapon specific series of ammunition, it can also fire rounds from the M29 Mortar (only at charge 3 or below though). The M252 Mortar can fire the following principal classifications of training and service ammunition.

1. High explosive (HE)--Designations M821, M821A1, M889, M889A1, M372-series, and M362. Used against personnel and light materiel targets.
2. White phosphorus (WP)--Designations M819 and M375-series. Used as a screening, signaling, casualty-producing, or incendiary agent. Red Phosphorus (RP) may also be used.
3. Illumination (ILLUM)--Designations M853A1 and M301-series. Used in night missions requiring illumination for assistance in observation.
4. Training practice (TP)--Designations M880, M879, M68 and sabot. Used for training in limited areas.
5. Infrared Illumination (IR)--Produces illumination which is only visible through the use of night vision devices.

Fuzes

The M224 rounds have two fuze types: The Multioption Fuze (M734) and the Point-Detonating Fuze (M935). The M734 is used for the M720 HE round and can be set to function as proximity burst, near-surface burst, impact burst, or delay burst.

M72 LAW



The M72 LAW (Light Anti-Tank Weapon, also referred to as the Light Anti-Armor Weapon or LAW) is a portable one-shot 66 mm unguided anti-tank weapon, designed in the United States by Frank Spinale et al while with the Hesse-Eastern Division of Norris Thermadore, produced by Nammo Raufoss AS in Norway.

The LAW replaced the bazooka as the United States Army's primary anti-tank weapon after the Korean War. It was intended that it would be replaced in service by the FGR-17 Viper (which would also replace the FGM-77 Dragon), but this program was cancelled and the M136 AT4 was introduced in its place. It can be compared with the better-known Soviet RPG-7 rocket propelled grenade, which uses a booster charge in addition to a rocket.

Description

The weapon consists of a rocket packed inside of a launcher made up of two tubes, one inside the other. While closed, the outer assembly acts as a watertight container for the rocket and the percussion cap-type firing mechanism that activates the rocket. The outer tube

contains the trigger, the arming handle, front and rear sights, and the rear cover. The inner tube contains the channel assembly which houses the firing pin assembly, including the detent lever. When extended, the inner tube telescopes outward toward the rear, guided by the channel assembly which rides in an alignment slot in the outer tube's trigger housing assembly. This causes the detent lever to move under the trigger assembly in the outer tube, both locking the inner tube in the extended position and cocking the weapon. Once armed, the weapon is no longer watertight even if the launcher is collapsed into its original configuration.

When fired, the propellant in the rocket motor completely combusts before leaving the tip of the launcher, producing gases around 1,400 °F (760 °C). The rocket propels the 66 mm warhead forward without significant recoil. As the warhead emerges from the launcher, six fins spring out from the base of the rocket tube, stabilizing the warhead's flight.

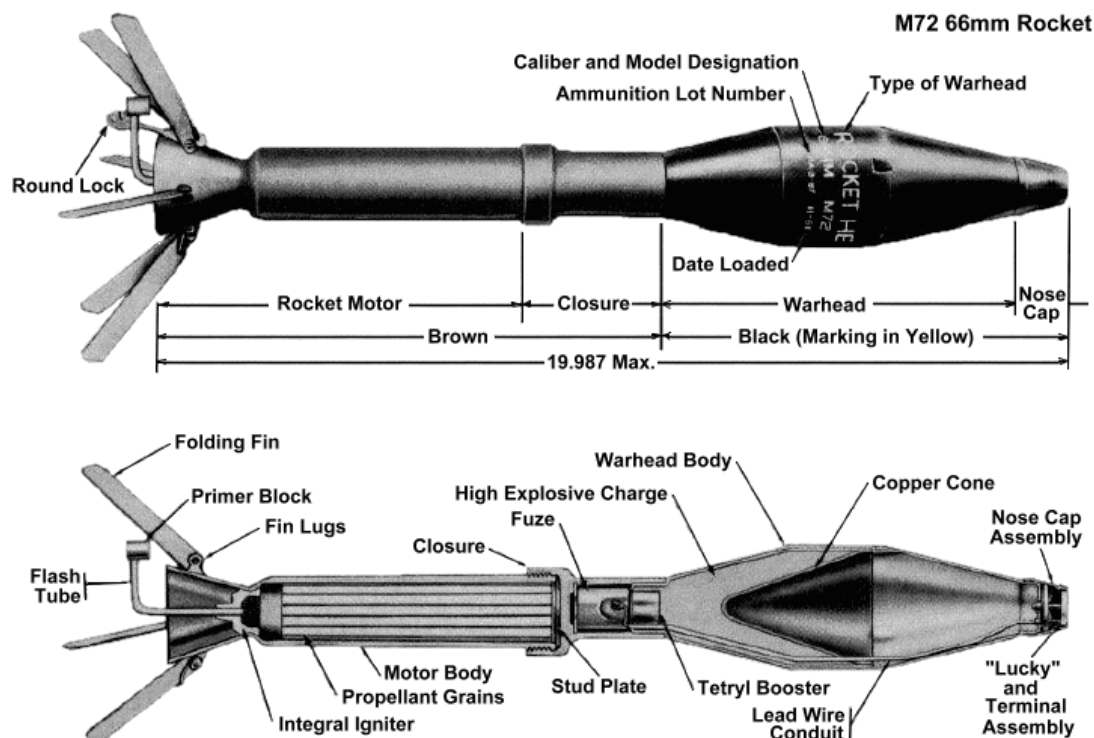
Once fired the launcher is no longer useful and may be discarded. Due to the single use nature of the weapon, it was issued as a round of ammunition by the Canadian Army and the United States Army.

Ammunition

The M72 LAW was issued as a prepackaged round of ammunition. Improvements to the launcher and differences in the ammunition were differentiated by a single designation. The most common M72 LAWs came prepacked with a rocket containing a 66 mm HEAT warhead which is attached to the inside of the launcher by the igniter. The warhead is activated by an impact sense sensor in the nose cone which is connected to the fuse. The fuse then detonates a booster which sets off the main charge. The force of the main charge forces the copper liner into a directional jet that is capable of penetrating up to 0.3 m (1 ft) of steel plate, 0.6 m (2 ft) of Reinforced concrete, or 1.8 m (6 ft) of soil.

A training variant of the M72 LAW, designated the M190, also exists. This weapon is reloadable and uses the 35 mm M73 training rocket. A subcaliber training device that uses a special tracer cartridge also exists for the M72. A training variant used by the Finnish armed forces fire 9mm tracer rounds.

The US Army tested other 66 mm rockets based on the M54 rocket motor used for the M72, including the M74 and XM96. These rockets were used with the XM191 and M202 Flash 4 tube launchers.



Service history

Although generally thought of as a Vietnam War era weapon which has been superseded by more powerful and sophisticated designs such as the SMAW and AT4, the M72 LAW has found a new lease of life in the ongoing (2006) operations in Iraq by the US Army and Afghanistan by the Canadian Army. The low cost and light weight of the LAW, combined with a proliferation of lightly-armored targets, make it ideal for the type of urban combat seen in Iraq and Afghanistan.

The Australian Army uses the M72A6 as an anti-building and secondary anti-armour weapon. It is carried by regular riflemen (including on operations in Iraq), while the heavier 84mm Carl Gustaf and Javelin are generally equipped by dedicated anti-armour troops.[citation needed]

Specifications (M72A2 and M72A3)

Launcher

- * Length:
 - o Extended: less than 1 m (35 in).
 - o Closed: 0.67 m (24.8 in).
- * Weight:
 - o Complete M72A2: 2.3 kg (8.1 lb).
 - o Complete M72A3: 2.5 kg (8.5 lb).
- * Firing mechanism: Percussion.
- * Front sight: reticle graduated in 25 m range increments.
- * Rear sight: peep sight adjusts automatically to temperature change.

Rocket

- * Caliber: 66 mm (2.6 in)

- * Length: 508 mm (20 in)
- * Weight: 1.8 kg (4 lb)
- * Muzzle velocity: 145 m/s (475 ft/s)
- * Minimum range (combat): 10 m (33 ft)
- * Minimum arming range: 10 m (33 ft)
- * Maximum range: 1,000 m (3,300 ft)

Maximum effective ranges

- * Stationary target: 200 m (220 yd)
 - * Moving target: 165 m (180 yd)
 - * Beyond these ranges there is less than a 50 % chance of hitting the target.
-

FGM-148 JAVELIN



Overview

Javelin is a fire-and-forget missile with lock-on before launch and automatic self-guidance. The system takes a top-attack flight profile against armored vehicles (attacking the top armor which is generally thinner) but can also take a direct-attack mode for use against buildings or fortifications. This missile also has the ability to engage helicopters in the direct attack mode. [1] The missile reaches a peak altitude of 150m in top attack mode and 50m in direct fire mode. The missile is equipped with an imaging infrared seeker. The tandem warhead is fitted with two shaped charges: a precursor warhead to detonate any explosive reactive armor and a primary warhead to penetrate base armor. The Javelin was used in the 2003 Invasion of Iraq, with devastating effects on the Iraqi version of T-72s and Type 69 tanks.

The missile is ejected from the launcher so that it reaches a safe distance from the operator before the main rocket motors ignite; a "soft launch arrangement." This makes it harder to identify the launcher and allows it to be fired from within buildings; however, back-blast from the launch tube still poses a hazard to nearby personnel. Thanks to this "fire and forget" system, the firing team may move on as soon as the missile has been launched.

The missile system is carried most often by a two man team consisting of a gunner and an ammo bearer, although it can be fired with just one person if necessary. While the gunner aims and fires the missile, the ammo bearer scans for prospective targets and watches for threats such as enemy vehicles and troops.

Specifications

Weight 11.8 kg (26.0 lb) - Missile
6.4 kg (14.1 lb) - CLU
Length 1.1 m (42.6 in) - Missile
1.2 m (47.2 in) - Launch Tube
Diameter 127 mm (5.0 in) - Missile
142 mm (5.6 in) - Launch Tube
Crew 2
Effective range 75 to 2500 m
Warhead Tandem shaped charge HEAT
Warhead weight 8.4 kg (18.5 lb)
Detonation
mechanism Impact force
Engine Solid Fuel Rocket
Guidance
system Infrared homing

Components

Launch Tube Assembly

Both men carry a disposable tube called the Launch Tube Assembly which houses the missile and protects the missile from harsh environments. The tube also has built in electronics and a locking hinge system that makes attachment and detachment of the missile to and from the Command Launch Unit a very quick and simple process.

Command Launch Unit

The gunner carries a reusable Command Launch Unit (in addition to the Launch Tube Assembly) more commonly referred to as a CLU (pronounced clue.) The CLU is the targeting component of the two part system. The CLU has three views which are used to find, target, and fire the missile. The CLU may also be used separately from the missile as a portable thermal sight. Infantry are no longer required to stay in constant contact with armored personal carriers and tanks with thermal sights. This makes the troops more flexible and able to perceive threats they would not otherwise be able to detect. In 2006 a contract was awarded to Toyon Research Corporation to begin development of an upgrade to the CLU enabling the transmission of target image and GPS location data to other units.[2]

Day view

The first view is a 4x magnification day view. It is mainly used to scan areas for light during night operation because light is not visible in the thermal views. It is also used to scan during times following the sunrise and sunset when the thermal image is hard to focus due to the natural rapid heating and/or cooling of the earth.

NFOV (Narrow Field of View)

The second view is the 4x magnification night view, and shows the gunner a thermal representation of the area viewed. This is also the primary view used due to its ability to detect infrared radiation and find both troops and vehicles otherwise too well hidden to detect. The screen shows a green scale view which can be adjusted in both contrast and brightness. The inside of the CLU is cooled by a small refrigeration unit attached to the sight. This greatly increases the sensitivity of the thermal imaging capability since the temperature inside the sight is much lower than that of the objects it detects. Due to the sensitivity this causes, the gunner is able to "focus" the CLU to show a very detailed image of the area being viewed by showing temperature differences of only a few degrees. The gunner operates this view with the use of two hand stations similar to the control stick found in modern cockpits. It is from this view that the gunner focuses the image and determines the area that gives the best heat signature on which to lock the missile.

Thermal view 2

Once the best target area is chosen the gunner presses one of the two triggers and automatically is sent to the third view. The third view is a 9x magnification thermal view. This process is similar to the automatic zoom feature on most modern cameras. This view is also available along with the previously mentioned views, all of which may be accessed with press of a button. It is not as popular however, because a high magnification view takes longer to scan a wide area. This view allows the gunner to further aim the missile and set the guidance system housed inside the actual missile. During this view is when information is passed from the CLU, through the connection electronics of the Launch Tube Assembly, and into the missile's guidance system. If the gunner feels uncomfortable with firing the missile, he can still cycle back to the other views without having to fire the missile. When the gunner is comfortable with the target picture he pulls the second trigger and establishes a "lock". The missile launches after a short hesitation.

WFOV (Wide Field Of View)

A great familiarity of each control and swift operation needs to be achieved before the unit can be deployed efficiently. American troops are trained on the system at the Infantry School in Fort Benning, Georgia, for two weeks. The soldiers are taught basic care and maintenance, operation and abilities, assembly and disassembly, and the positions it can be fired from. Soldiers are also taught to distinguish between a variety of vehicle types even when only a rough outline is visible. The soldiers must accomplish several timed drills with set standards before being qualified to operate the system in both training and wartime situations. There are also smaller training programs set up on most Army bases that instruct soldiers on the proper use of the system. At these courses the training program might be changed in small ways. This is most commonly only minor requirements left out due to budget, the amount of soldiers vs. simulation equipment, and available time and resources. Both types of training courses have required proficiency levels that must be met before the soldier can operate the system in training exercises or wartime missions.

Advantages and disadvantages

Advantages

The portable system is easy to separate into main components and easy to set up when needed. Compared to more cumbersome anti-tank weapon systems, the difference is noticeable. For example, a TOW requires a heavy tripod stand, a bulky protective case for the thermal sight, a larger, longer launch tube, and requires much more time to assemble and prepare. The Javelin (although very heavy) is lighter than other missiles and their necessary parts.

Although the CLU's thermal imaging may hinder aiming, its thermal targeting allows the Javelin to be a fire-and-forget system. This gives the firer an opportunity to be out of sight and possibly moving to a new angle to fire from, or out of the area by the time the enemy realizes they are under attack. This is much safer than using a wire-guided system because the firer must stay at the same location the missile was fired from and guide the missile into the target.

Another advantage is the Javelin's power at impact. The missile has a tandem shaped charge in its warhead that is made to penetrate reactive armor. The Javelin was created with the intent to be able to penetrate any

tank armor and was tested on the M1 Abrams Tank. With the top attack mode it has an even greater ability to destroy the tank because it can attack where most tanks are the weakest.

The soft launch capability of the Javelin allows it to have only a minimal backblast area. This enables the Javelin to be fired from inside a wide variety of structures. This gives the Javelin advantages in urban fighting over the widely used AT4, which has a very large backblast area, although this is lessened in the AT4 CS. A large backblast area would seriously injure personnel if fired from inside a small structure.

Disadvantages

The main drawback of the system is its 49.5 lb total weight. This does not account for the additional batteries (BA5590 lithium battery) which weigh around 2.25 lbs each. Each battery is estimated to last 4 hours by the Javelin's manufacturer. A normal load for batteries (not counting the "just in case" extras that most teams carry) is 5-10. This number may be more or less depending on the length of mission. The system is designed to be portable by infantry on foot and weighs more than the original specified weight the army called for.

Another drawback of the system is the reliance on a thermal view to acquire targets. The thermal views are not able to operate until the refrigeration component has cooled the system. The manufacturer estimates 30 seconds until this is complete, but depending on the ambient temperature, this process may take much longer. The thermal view is occasionally hindered by a naturally occurring phenomena where the temperature of the earth heats or cools rapidly, and may interfere with the recognition and lock-on of the intended target.

The range of the Javelin is another disadvantage. With a current maximum range of only 2,500 m, it falls short of the other mainstay of anti-tank weaponry, the BGM-71 TOW. The TOW is much larger and has a maximum range of 3,000 m for the BGM-71A, and 3,750 m for all others (BGM-71B through BGM-71F.)

THE MK 19 GRENADE LAUNCHER

The Mk 19 Grenade Launcher is a belt-fed automatic 40 mm grenade launcher or grenade machine gun that entered U.S. military service during the Cold War, first seeing action during the Vietnam War and remaining in service today.



<http://www.peosoldier.army.mil>

Overview

The Mk 19 fires 40 mm grenades at a cyclic rate of 375 to 400 rounds per minute, giving a practical rate of fire of 60 rounds per minute (rapid) and 40 rounds per minute (sustained). The weapon operates on the blowback principle, which uses the chamber pressure from each fired round to load and re-cock the weapon. The Mk 19 is able to lob its grenade at a maximum distance of 2,212 meters, though its effective range for a point target is about 1,500 meters, since the large rear leaf sight is only graduated to 1500 meters. The nearest safe distance to launch the grenade is 75 meters. In addition, the Mk 19's flash suppressor and its lack of smoke during firing makes it difficult for enemies to spot and counter it. For night operation, an AN/TVS-5 night vision sight can be fitted.

The Mk 19 is a man-portable crew-served weapon that can fire from a tripod mounted position or from a vehicle mount (this being the preferred method as the weapon alone weighs 75.6 lbs). The primary ammunition for Mk 19 is the high explosive dual-purpose M430 grenade. Upon impact, the grenade can kill anyone within the radius of five meters, and wound them within the radius of 15 meters. It can also punch through two inches of rolled homogeneous armour with a direct hit (0 Degree Obliquity), which means it can penetrate most infantry fighting vehicles and armored personnel carriers. It is especially effective when used against enemy infantry formations. The ammunition comes in 32 or 48 round cans weighing 42 and 60 lb (20 and 30 kg). Due to its low recoil and comparatively light weight, it has been adapted for use on many different platforms, including small attack boats, fast attack vehicles such as the Humvee (HMMWV), AAV and Stryker, military jeeps and a large variety of naval mounts.



The Mk 19 automatic grenade launcher replaced the earlier Mk 18 hand-cranked multiple grenade launcher. The 40 mm ammunition used (40x53mm) is not interchangeable with that used in the M203 (40x46mm). The M203 grenades are technically "low-velocity" grenades, and are generally of the standard High Explosive variety, whereas the Mk 19 utilizes "medium-velocity" High Explosive Dual-Purpose (HEDP) variety. The Mk 19 utilizes an open bolt principle. The rounds are mechanically fed onto the bolt face with the pull of the charging handles. When the trigger is pressed, the bolt closes, and the firing pin is released. The recoil blows back the bolt, dropping the empty casing, and then feeds a new round onto the bolt face. This design has caused sporadic fatalities in the crews that operate the system.[citation needed] If the weapon system jams, the operator may need to remove a live round from the open bolt face. If the breech closes during this procedure, the round can detonate inside the gun, killing and/or maiming anyone nearby.[citation needed] However, the weapon will not accidentally or intentionally fire a round if one of the charging handles is in the down position. These incidents are rare.[citation needed]

The Mk 19 is made by General Dynamics and Saco Defense Industries.

CARL GUSTAV RECOILLESS RIFLE



The Carl Gustav (also Carl-Gustaf) is the common name for the 84 mm man-portable multi-role recoilless rifle produced by Saab Bofors Dynamics (formerly Bofors Anti-Armour AB) in Sweden. The first prototype of the Carl Gustav was produced in 1946, and while similar weapons of the era have generally disappeared, the Carl Gustav remains in widespread use today. British troops refer to it as the Charlie G, while Canadian troops often refer to it as the 84 or Carl G. US troops often refer to it as the RAAWS or Ranger Anti-Armor Weapon System, the Gustav or simply the goose. In Australia it is irreverently known as Charlie Gutsache (guts ache, slang for stomach pain). In its country of origin it is officially named Grg m/48 (Granatgevär or grenade rifle, model 48) but is sometimes nicknamed Stuprör (drainpipe) due to the fact that the weapon mainly consists of a long tube.

Description

The basic weapon consists of the main tube with the breech-mounted Venturi recoil damper, with two grips near the front and a shoulder mount. The weapon is fitted with iron sights, but is normally aimed with the attached 3x optical sight with a 17 degree (300 mrad) field of view. Luminous front and rear sight inserts are available for the iron sights when aiming at night, but an image intensification system may also be used.

The Carl Gustav can be fired from the standing, kneeling, sitting or prone positions, and a bipod may be attached in front of the shoulder piece. An operating handle called a "Venturi lock" is used to move the hinged breech to one side for reloading. The weapon is normally operated by a two-man crew, one carrying and firing the weapon, the other carrying ammunition and reloading.

Specifications

- * Calibre: 84 mm rifled (24 lands/progressive twist).[3]
- * Crew: 2 optimal, 1 minimum.
- * Weights: 14.2 kg (M2); 8.5 kg (M3); 0.8 kg (mount)
- * Length: 1.065 m
- * Breech: Hinged
- * Rate of fire: 6 rounds per minute.
- * Sights: Iron sights; optical 3x; laser range finder; image intensification system.

M3 MAAWS

The M3 MAAWS is the US designation for the Carl Gustav M3 recoilless rifle. It is primarily used by USSOCOM forces such as the United States Army Special Forces, 75th Ranger Regiment, United States Navy SEALs, Delta Force, and DEVGRU.

The M3 MAAWS fires the following ammunition:

- * High Explosive Dual Purpose (HEDP) round
- * High Explosive Anti-Tank (HEAT) round
- * High Explosive (HE) round
- * Illumination round
- * Smoke round
- * Area Defence Munition (ADM) flechette round

Ammunition

Improvements to the ammunition have been continual. While the older HEAT rounds are not particularly effective against modern tank armor, the weapon has found new life as a bunker-buster with an HEDP round. In addition, improved HEAT, high explosive (HE), smoke and illumination (star shell or flare) ammunition is also available. For full effectiveness, illumination rounds have to be fired at a very high angle, creating a danger for the gunner as the backblast from firing can burn him. For this reason several armies have retired the illumination rounds, while the US Army requires that they be fired from a standing position.

The following are Canadian designations (other countries use similar terminology, replacing the "FFV")

- * FFV441 is an HE round, useful in a "lobbed" trajectory to 1,000m, which can be fused to either detonate on impact or as an airburst.

- * FFV441B is an HE round with an effective range against personnel in the open of 1,100 m. The round arms after 20 to 70 m of flight, weighs 3.1 kg, and is fired at a muzzle velocity of 255 m/s[3].

- * FFV469 is a smoke round fired like the FFV441, with a range of about 1,300 m. The 3.1 kg round is also fired at 255 m/s[3].

- * FFV502 is an HEDP round with the ability to be set to detonate either on impact or one-tenth of a second afterwards. Effective range is 1,000 m against dispersed soft targets such as infantry in the open, 500 m against stationary targets, and 300 m against moving targets. Minimum range is 15 to 40 m to arm the warhead. Penetration exceeds 150 mm of rolled homogeneous armour (RHA). Ammunition weight is 3.3 kg and muzzle velocity is 230 m/s.[3]

- * FFV545 is an illuminating starshell, fired up to 2,300 m maximum range, but with an effective envelope of 300 to 2,100 m. Suspended by parachute, the starshell burns for 30 seconds while producing 650,000 candela, providing a 400 to 500 m diameter area of illumination.

- * FFV551 is the primary HEAT round and is a rocket-assisted projectile (RAP). Effective range is up to 700 m (400 m against moving targets) and penetration up to 400 mm of RHA. Ammunition weight is 3.2 kg and muzzle velocity is 255 m/s.[3]

- * FFV552 is a practice round with the same ballistics as the 551.

- * FFV651 is a newer HEAT round using mid-flight rocket assistance for ranges up to 1,000m. In theory, it has less penetration than the FFV441, but it includes a stand-off probe for the fuse to improve performance against reactive armour.

- * FFV751 is a tandem-warhead HEAT round with an effective range of 500 m and ability to penetrate more than 500 mm of armour. Weight is 4 kg.



Specifications

Weight 8.5 kg (rifle); 0.8 kg mount

Length 1.1 meters

Crew Two (gunner and loader), but may be used by a single operator at a reduced rate of fire.

Caliber 84 mm

Rate of fire 6 rounds per minute

Muzzle velocity 230-255 m/s

Feed system Hinged breech

Sights Open (iron) sights; optical 3x; laser rangefinder; image intensification system



M198 HOWITZER



United States Department of Defense

The M198 howitzer is a medium-sized, towed artillery piece. It can be dropped by parachute or transported by a CH-53E Super Stallion. The M198 is deployed in separate corps- and army-level field artillery units, as well as in artillery battalions of light and airborne divisions.

Specifications

Weight	7,154 kg (15,772 lb)
Length	11 m (36 ft 2 in) in firing position; 12.3 m (40 ft 6 in) in towing position
Width	2.8 m (9 ft 2 in) in towing position
Height	2.9 m (9 ft 6 in) in towing position
Crew	9 enlisted men
Caliber	155 mm
Rate of fire	4 round/min maximum; 2 round/min sustained
Max range	22,400 m (14 miles) with conventional ammo; 30,000 m (18.6 miles) with rocket propelled

Capable munitions

- High Explosive (HE) (M-107 Normal Cavity): Explosive Composition B material packed into a thick shell which causes a large blast and sends razor-sharp fragments at extreme velocities (5,000–6,000 meters per second). The kill zone is approximately a radius of 50 meters and casualty radius is 100 meters. The Marine Corps also uses the M795 High Explosive round.
- Rocket Assisted Projectile: A rocket-assisted HE round that adds to the maximum range of the normal HE.
- Smoke: A base-ejecting projectile used to cover troop and vehicle movements.
- White Phosphorus (WP): A base-ejecting projectile which can come in two versions: felt-wedge and standard. White phosphorus smoke is used to start fires, burn a target, or to create smoke.

- **Illumination:** Illumination projectiles are a base-ejecting round which pop out a bright flare approximately 600 meters above the ground and illuminate an area of approximately 1000 meters. Illumination rounds are often used in conjunction with HE rounds. Illumination rounds can also be used during the daytime to mark targets for aircraft. The M485 Illumination round burns for 120 seconds.
 - **DPICM:** Dual-Purpose Improved Conventional Munition. A base-ejecting projectile which drops 88 bomblets above a target. Each bomblet has a shaped-charge munition capable of penetrating two inches of solid steel as well as a fragmentation casing which is effective against infantry in the open. The DPICM round is effective against armored vehicles, even tanks, and is also extremely useful against entrenched infantry in positions with overhead cover. Some bomblets fail to detonate and the undetonated bomblets are very dangerous to civilians (like a land mine) so they cannot be used in urbanized areas.[citation needed]
 - **ADAMS (Area Denial Artillery Munition System):** An artillery round that releases antipersonnel mines. These mines eject tripwires to act as booby traps, and when triggered are launched upward before exploding. They are designed to self-destruct after a pre-determined period of time.
 - **RAAMS:** An artillery round that releases anti-armor mines, usually used along with ADAM rounds to prevent the antitank mines from being removed. Designed to self-destruct after a pre-determined period of time.
 - **Copperhead:** An artillery launched guided high explosive munition which is used for very precise targeting of high value targets such as tanks and fortifications. It requires the target be designated with a laser designator system. This round is currently no longer produced.
 - **SADARM:** An experimental munition which is fired in the general direction of an enemy vehicle. The shell activates at a certain point in time ejecting a parachute and then guides itself to the nearest vehicle.
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L118 LIGHT GUN



The L118 Light Gun is a 105 mm towed howitzer, originally produced for the British Army in the 1970s and widely exported since, including to the United States, where a modified version is known as the M119A1. The proper name for it is "Gun, 105mm, Field, L118" but normally just called "the Light Gun".

Specifications

Weight	1858 kg
Length	8.8 m
Width	1.78 m
Height	2.13 m
Caliber	105 mm
Breech	vertical sliding block
Carriage	box trail
Elevation	-100 to 1250 mils
Traverse	6400 mils on its platform and 100 mils left or right
Rate of fire	6-8 rounds per minute
Max range	17,200 m

Design

The Light Gun appears to owe a number of its features to the QF 25 pounder, unsurprisingly since RARDE was the successor to the Design Department, Woolwich. Among these features are its vertically-sliding block breech, and a box trail instead of a split trail; a traversing platform is normally used with it. Its comparatively light weight is also attributed to the nature of the steel used in the carriage and ordnance, and other weight-reducing features including its narrow wheelbase.

When being towed in the unfolded position, the A-Frame is fitted to the front transom in order to support the elevating mass. A recent modification makes it possible to keep the gun in this position indefinitely at speeds up to 40 mph. For long distance transport, cleaning and storage, the barrel is reversed and clamped to the end of the trail.

When first introduced in the British Royal Artillery, the L7 or L7A1 dial sight and its carrier, incorporating an integral elevation scale and internal lighting powered by Trilux nuclear light sources, was used to aim the gun for indirect fire. Since Light Gun entered service after the introduction of Field Artillery Computer Equipment (FACE) it never, unlike Abbot, had gun rules. Therefore it has a single Quadrant Elevation scale. These optical indirect fire sights are now only used in recruit training. The L7 sight is a modified version of a German Leitz instrument.

The guns also have a direct fire telescope and were originally issued with a night telescope using image intensification.

Ammunition



The 105 mm Fd Mk 2 ammunition has two propelling cartridges and a blank cartridge (for saluting purposes). The normal cartridge has 5 propellant zones (Charges 1, 2, 3, 4, and 5). A supplementary Charge 4½ is also available for high angle fire to improve charge overlap between charges 4 and 5. It is peculiar to Light Gun and was not used with Abbot. A separate "Charge Super" cartridge is used for firing to maximum range.

Both Charge 5 and Charge Super project beyond the end of the metal cartridge case. Unlike the M1 ammunition, which is 'semi fixed' and loaded as a complete round, 105 mm Fd is 'separate'; the shell is loaded and rammed by hand then the cartridge is loaded. By the time L118 entered service sub-zones A and B originally used with Abbot had been replaced by a spoiler to reduce the minimum range at high angle fire when this was required.

The 105 mm Fd Mk 2 projectiles are the same as used with Abbot, apart from the current introduction of a new L50 HE shell and L51 red phosphorus smoke shell. The new HE is slightly longer than current shells, uses insensitive

plastic bonded explosive and provides significantly greater lethality, which the supplier claims is equivalent to 155 mm HE M107. A base-bleed HE shell, maximum range reportedly 21 - 22 km, was developed in the late 1990s but has not entered service.

Subsequent enhancements

During the early 1990s all UK L118 were fitted with a Muzzle Velocity Measuring Device (MVMD), a radar, and its power supply.

In 2002 the British Army's L118 guns completed replacement of their optical sights with the Artillery Pointing System (APS) LINAPS. This is a self-contained system that uses ring laser gyros to determine azimuth, elevation angle and trunnion tilt angle. It also includes facilities for navigation and self-survey using Global Positioning System, inertial direction measurement and distance measurement. All this can be used anywhere in the world to lay the gun without external references. An upgraded APS may also perform some ballistic calculation functions including muzzle velocity prediction using Kalman filters or a neural network.

A capability enhancement program that started delivering improvements to UK guns in 2007 aims at reducing weight and improving some components. Weight reduction measures include replacing some steel components with titanium. The MVMD is also more tightly coupled with the layer's display unit of the APS, reducing electrical power requirements.



RBS 70

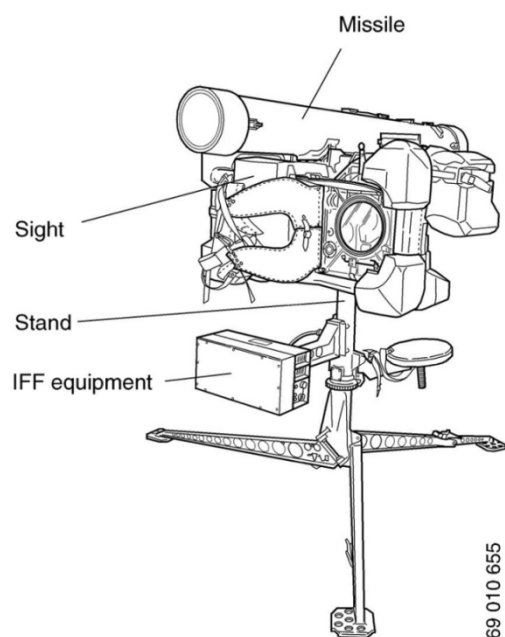


Introduction

RBS 70 (Robotsystem 70) is a Swedish MANPADS designed for combat in all climate zones and with little to no support from other forces. It uses the RB 70 missile which is also in use in a number of other Swedish missile systems. The RBS-70 is a man portable SAM system, and is set to be the only SAM system in the Australian Army upon retirement of Rapier. More sophisticated Bolide missiles have now been purchased.

Specifications

Weight	15 kg
Length	1.32 m
Diameter	106 mm
Warhead	1.1 kg Combined with prefragmentation and shaped charge (armour piercing)
Detonation mechanism	Adaptive proximity fuze function with 3 selectable modes (Off, Normal, Small target)
Engine	Booster and sustainer with smokeless solid propellant
Wingspan	32 cm
Operational range	250 m–8 km
Flight altitude	4,000 m
Speed	Mach 2 (Mark 2) Mach 1.6 (Mark 1)
Guidance system	Laser beam riding missile
Launch platform	tripod, weapon platform (ASRAD-R) and warship



RBS 70 is a short-range man-portable (MANPADS), laser-guided missile system. The operator (skytte in Swedish, literally meaning "shooter") receives instructions on the position of the target from a local SLT (combat-control terminal) which is about the size of a laptop. The SLT in turn receives information through an encoded radio broadcast made by either a radar station (PS 90, PS 70) or some other information gathering source. When the target has been acquired by the operator he turns off the safety, which switches on the main laser and sends out an IFF signal and if positive makes firing impossible. If the operator is confident that he has a good track he fires. The missile then flies in the beam of the laser from the sight, adjusting its position constantly to stay within the beam. This puts a lot of pressure on the operator who needs to have a very steady aim. If the missile is guided to within 30 meters of the target a kill is 95% assured.

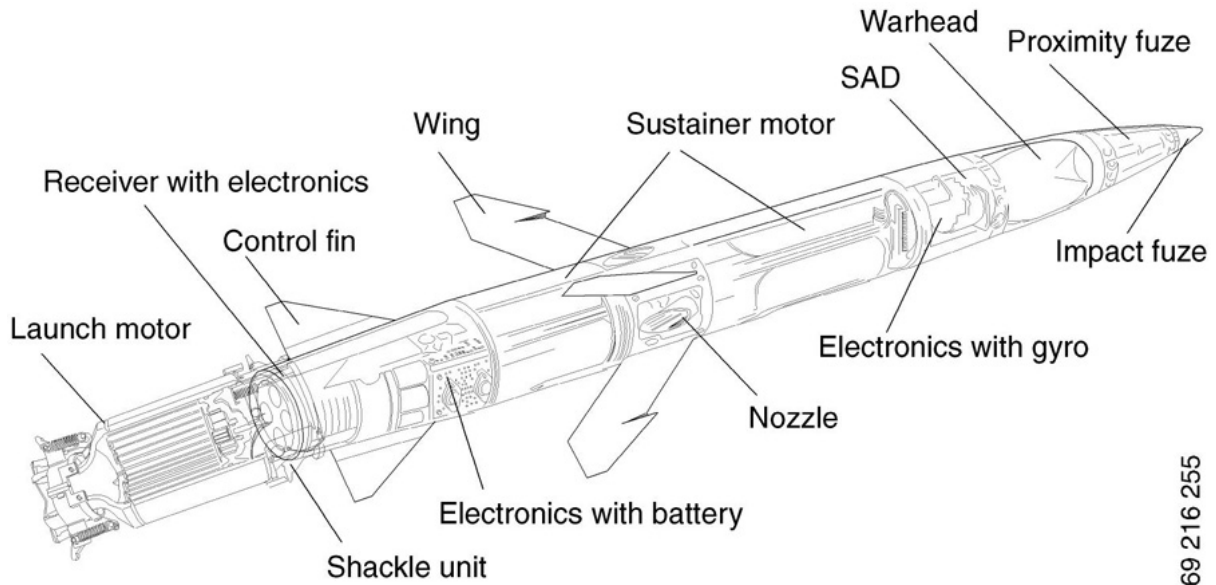
The exhaust is vented in the missile's midsection and the laser beam riding system is fitted in the tail, where it is extremely difficult to jam.

RB 70 has been constantly updated and improved, the first versions (Mk 0) had a short range and limited kill capabilities but this was much improved in later versions. Mk 1 and Mk 2 followed shortly and are the standard RB 70 with a range of 5,000–6,000 m and a ceiling of 3,000 m. RBS 70 is a product of Saab Bofors Dynamics and is operational in 15 customer countries, on all continents and in arctic, desert, and tropical environments.

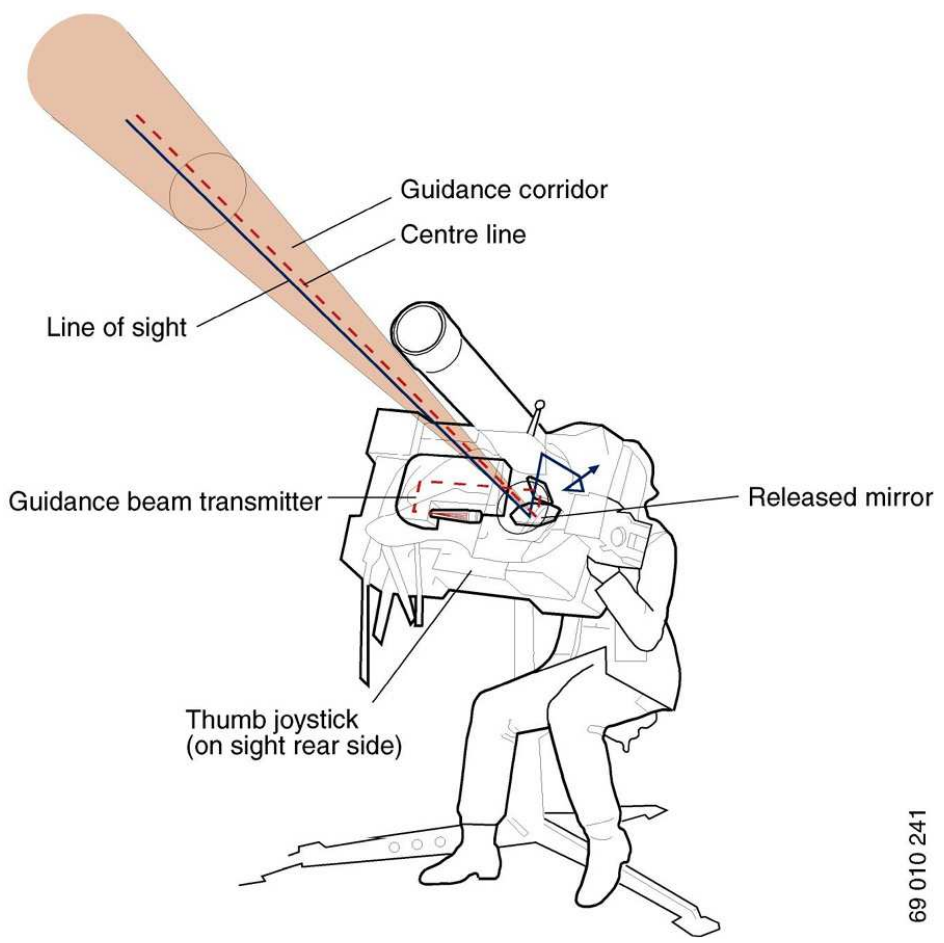
The latest development is the BOLIDE system. It has a range of 8 km and can reach an altitude of 5 km. The BOLIDE has also a new warhead, which is both fragmentating and has a shaped charge, the adaptable proximity fuse gives it full effectiveness against a wider variety of targets, and new reprogrammable electronics gives it the possibility to engage attack cruise missiles and UAVs. The BOLIDE missile is an RBS 70 Mk 2 upgrade that is faster (Mach 2 vs Mach 1.6), with a range up to 8 km (4.8 miles). The BOLIDE deliveries were initiated in 2005

The Bolide missile is an RBS 70 Mk 2 upgrade that is faster (Mach 2 vs Mach 1.6), with a range up to 8 km (4.8 miles), an adaptable proximity fuse that gives it full effectiveness against a wider variety of targets, and new reprogrammable electronics. The 4th generation system incorporates the BOLIDE all-target missile, BORC clip-on thermal imager, a digital IFF Interrogator, a PC-based training simulator, and an external power supply for training. These improvements reportedly allow the RBS-70 Bolide to be deployed against surface targets as well, which makes it an especially interesting choice for naval use given the proliferation of small fast attack boat threats.





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