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# **TANKS AND COMBAT VEHICLES RECOGNITION GUIDE**

**Christopher F Foss**

**FULLY  
UPDATED  
SECOND  
EDITION**

**How to identify  
modern tanks and  
combat vehicles**



# TANK & COMBAT VEHICLE RECOGNITION GUIDE

Christopher F. Foss



HarperCollins *Publishers*

In the USA for information address:

HarperCollinsPafa//s/?ers  
10 East 53rd Street  
New York  
NY 10022

In the UK for information address:

HarperCollinsPw6//s/7ers  
77-85 Fulham Palace Road  
Hammersmith  
London W6 8JB

First Published by HarperCollinsPfy6//s/7ers  
2000

© Christopher F. Foss 2000

1 3 5 7 9 1 0 8 6 4 2

Design: Rod Teasdale

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Printed in Italy



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# Introduction

The aim of this book is twofold: firstly, to act as a convenient handbook for the reader to identify quickly and accurately almost any modern armoured fighting vehicle (AFV) in service today; secondly, to provide key information on the vehicle.

Some entries are more highly illustrated because there are so many local variants; indeed for some vehicles space limitations have prevented inclusion of every possible variation. A typical example is the M48. This was built with a 90mm gun, but many countries have refitted it with a 105mm gun which has a distinctive bore evacuator mid-way along the barrel; some countries have also added a thermal sleeve. US M48s have never been fitted with skirts, but the South Korean vehicles have skirts.

Recognition features can be further complicated by additional stowage bins and baskets, while the introduction of reactive armour, for example on the Israeli M48, M60 and Centurion tanks and Russian T-64, T-72 and T-80 MBTs, alters their appearance completely.

Complications can arise from placing a vehicle in



*This Iraqi T-55 sports add-on armour on both turret and hull.*

one particular section. For example, the Alvis Scimitar is used by the British Army as a reconnaissance vehicle, other countries use it as a light tank. As it is one of the few tracked reconnaissance vehicles, we have included it under tanks. 4x4, 6x6 and 8x8 vehicles have all been grouped, as they have in the wheeled armoured personnel carriers section, but some vehicles have

been developed for use in a wide range of roles. For example, the Cadillac Gage LAV-150 and the Swiss MOWAG Piranha range of 4x4, 6x6 and 8x8 vehicles can be fitted with weapons ranging from a 7.62 mm machine gun to a 105mm gun in the case of the 8x8 version.

Although space limitations have prevented all possible versions being included, many of these are mentioned in the text. Each entry has full technical specifications, key recognition features, development notes, list of variants, current status and list of users, manufacturer and, for most entries, a side view drawing and three photographs.

The fourth edition of this book, which has become the standard work of its type in its class, was compiled in the mid-1999. This edition has over 380 new photographs and drawings and virtually every entry has been updated. In addition there are 16 new entries covering new armoured vehicles that have entered production or service or are expected to do so in the near future.

Comments and new photographs for future editions should be sent to the author as soon as possible. The author would like to thank the many



*6x6 vehicles can carry many different turrets. In the reconnaissance role the Pandur has a two person 90mm turret.*

companies, governments and individuals who have provided information and photographs for the book. Special thanks are due to my wife Sheila for her help and encouragement while the book was being compiled.

**Christopher F Foss**





# TANKS

# TAM Tank (Germany/Argentina)

## KEY RECOGNITION FEATURES

- Hull similar to Marder MICV with well sloped glacis plate. Driver front left, horizontal hull top with turret towards rear, hull back slopes to rear then inward at mid point
- Turret has flat sides that slope slightly inward, turret bustle extends almost to hull rear, commander's cupola right side of flat roof. 105mm gun mounted in external mantlet, with fume extractor
- Suspension each side has six road wheels, drive sprocket front, idler rear and three track-return rollers. Upper part sometimes covered by skirt.

## SPECIFICATIONS

Crew:	4
Armament:	1 x 105mm, 1 x 7.62mm MG (coaxial), 1 x 7.62 MG (anti-aircraft), 2 x 4 smoke grenade dischargers
Ammunition:	50 x 105mm, 6,000 x 7.62mm
Length gun forwards:	8.23m
Length hull:	6.775m
Width:	3.29m
Height to turret top:	2.43m
Power-to-weight ratio:	24.27hp/tonne
Ground clearance:	0.45m
Weight, combat:	30,000kg
Weight, empty:	28,000kg
Ground pressure:	0.78kg/cm <sup>2</sup>
Engine:	MTU MB 833 Ka 500 supercharged 6-cylinder diesel developing 720hp at 2,200 rpm
Maximum road speed:	75km/hr
Maximum road range:	590km
Maximum road range with auxiliary tanks:	940
Fuel capacity:	640 lit
Fording:	1.5m
Fording with preparation:	2.25m
Fording with snorkel:	4m
Vertical obstacle:	1.0m
Trench:	2.5m
Gradient:	60°
Armour:	Classified
Armour type:	Steel
NBC system:	Yes

## DEVELOPMENT

In 1974 Thyssen Henschel (today Henschel Wehrtechnik) was awarded a contract by Argentina for design and development of a new medium tank designated TAM (*Tanque Argentina Mediano*), as well as infantry combat vehicle VCI (*Vehículo Combats Infantería*) subsequently redesignated VCTP. Three prototypes of each were built and shipped to Argentina. Production commenced at a new factory in Argentina with a requirement for 512 TAMs and VCTPs, but production was stopped after about 350 vehicles for budgetary reasons. Further development by the company has resulted in the TH301, which has a number of improvements including a new fire-control system and a more powerful engine.

Driver sits front left of TAM, engine to his right and turret towards rear. Commander and gunner sit right of turret, loader left. The 105mm gun power-elevates from -7° to +18° and turret traverses through 360°. A 7.62mm MG is mounted coaxial with main armament and there is a similar weapon on the roof for air defence.

To extend its operational range, long range fuel tanks can be fitted at hull rear. Optional equipment for TH301 includes additional armour protection.

## VARIANTS

VCA 155, lengthened TAM chassis fitted with turret of Italian Palmira 155mm self-propelled howitzer, developed to meet requirements of Argentinian Army.

VCRT, ARV based on chassis of TAM for Argentinian Army, prototype only.

Rocket launchers, prototypes of 160mm and 350mm multiple launch rocket systems have been built (chassis is Argentinian with rocket launchers from Israel). In addition many trial versions in Germany.



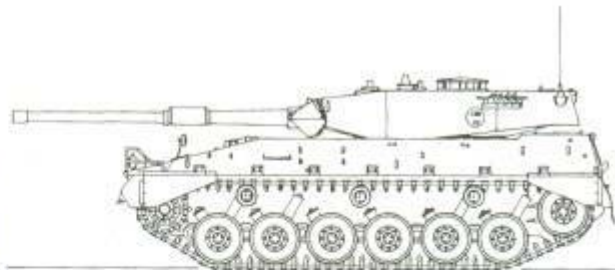
## LIGHT TANKS AND MAIN BATTLE TANKS



*Above: TAM*

*Above right: TAM*

*Right: TH301*



### STATUS

Production completed in Argentina. Production yet to commence in Germany. In service with Argentina.

### MANUFACTURERS

Henschel Wehrtechnik, Kassel, Germany; TAMSE, Buenos Aires, Argentina.

# Steyr SK 105 Light Tank (Austria)

## KEY RECOGNITION FEATURES

- Distinctive oscillating turret centre of vehicle, commander's cupola left, large box-shaped infra-red/white searchlight right side of turret roof, laser rangefinder below
- 105mm gun has double baffle muzzle brake and thermalsleeve, overhangs front of vehicle
- Suspension has five road wheels, idler front, drive sprocket rear, three track-return rollers

## SPECIFICATIONS

Crew:	3
Armament:	1 x 105mm, 1 x 7.62mm MG (coaxial),
Ammunition:	2 x 3 smoke grenade dischargers
Length gun forwards:	42 x 105mm, 2,000 x 7.62mm
Length hull:	7.735m
Width:	5.582m
Height:	2.5m
	2.88m (searchlight),
	2.529m (commander's cupola)
Ground clearance:	0.4m
Weight, combat:	17,700kg
Power-to-weight ratio:	18.1hp/tonne
Ground pressure:	0.67kg/cm <sup>2</sup>
Engine:	Steyr 7FA 6-cylinder liquid-cooled 4-stroke turbocharged diesel developing 320hp at 2,300rpm
Maximum road speed:	70km/hr
Maximum range:	500km
Fuel capacity:	420 lit
Fording:	1m
Vertical obstacle:	0.8m
Trench:	2.41m
Gradient:	750/0
Side slope:	40%
Armour:	40mm (maximum)
Armour type:	Steel
NBC system:	Yes
Night vision equipment:	Yes (infra-red for driver and commander)

## DEVELOPMENT

SK 105, also known as *Kirassier*, was developed from 1965 by Saurer-Werke, taken over by Steyr-Daimler-Puch in 1970, to meet the requirements of the Austrian Army for a mobile anti-tank vehicle.

First prototype was completed in 1967 with pre-production vehicles following in 1971.

Driver sits front left, turret centre, engine and transmission rear. Oscillating turret is an improved French Fives-Cail Babcock FL-12 in which 105mm gun is fixed on upper part, commander left, gunner right. The 105mm gun is fed by two revolver-type magazines, each of which holds six rounds. Ammunition fired includes HE, HEAT and smoke, but with modifications SK 105 also fires APFSDS projectiles.

Turret traverse and elevation is powered, manual controls for emergency use, turret traverse 360°, 105mm gun in upper part of turret elevates from -8° to +12°.

## VARIANTS

Steyr SK 105/A2 is upgraded SK 105/A1 with a number of improvements including new FCS and fully automatic ammunition loading system.

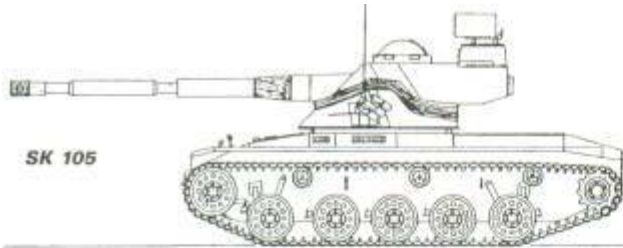
Steyr SK 105/A3 is still at prototype stage and has a new oscillating turret with improved armour protection and fitted with 105mm M68 rifled tank gun which can fire standard NATO 105mm ammunition including APFSDS.

Greif armoured recovery vehicle.

Pioneer vehicle is based on ARV.

Driver training vehicle is SK 105 with turret removed and replaced by new superstructure for instructor and other trainee drivers.

## LIGHT TANKS AND MAIN BATTLE TANKS



*Above: SK 105*



*Above: SK 105*

*Right: SK 105*

### STATUS

Production complete. In service with Argentina, Austria, Bolivia, Botswana, Morocco and Tunisia.

### MANUFACTURER

Steyr-Daimler-Puch AG, Vienna, Austria.



# NORINCO Type 85-11 MET (China)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate, turret centre and raised engine compartment at rear. 125 mm gun has fume extractor mid-way down barrel
- Turret has sloping front with vertical sides with six smoke grenade launchers mounted halfway along turret side, large stowage basket at rear, 12.7mm MG on right side of turret roof
- Suspension either side consists of six road wheels with idler at front, drive sprocket at rear and track return rollers, upper part of suspension covered by skirt with wavy line to lower part

## SPECIFICATIONS

Crew:	3
Armament:	1 x 125mm gun, 1 x 7.62mm MG (coaxial), 1 x 12.7mm (anti-aircraft), 2 x 6 smoke grenade launchers
Ammunition:	40 x 125mm, 2000 x 7.62mm, 300 x 12.7mm (estimate)
Length gun forwards:	10.28m
Length hull:	7.3m (estimate)
Width:	3.45m
Height:	2.30m (turret top)
Ground clearance:	0.48m
Weight, combat:	41,000kg
Power-to-weight ratio:	18.5 hp/tonne
Engine:	V-12 supercharged diesel developing 730hp
Maximum road speed:	57.25 km/h
Maximum road range:	500km (estimate)
Fuel capacity:	1000l (estimate)
Fording:	1.4m
Vertical obstacle:	0.8m
Trench:	2.7m
Gradient:	60%
Side slope:	40%
Armour:	Classified
Armour type:	Steel/laminate
NBC:	Yes
Night vision equipment:	Yes

## DEVELOPMENT

The Type 85-11 MBT is a further development by NORINCO (China North Industries Corporation) of the Type 80 MBT (qv) but has many improvements including a different hull and turret with a significant improvement in armour protection. The driver is seated in the hull at front left with ammunition to his right with turret in centre. The gunner is seated on the left of the turret and the commander on the right.

Main armament is a 125mm smooth bore gun which is fed by an automatic loader, so enabling the crew to be reduced to three. Ammunition is of the separate loading type eg projectile and charge and is similar to that used in the Russian T-72 MBT. Turret traverse is 360 degrees with weapon elevation from -6 to +14°. The main armament is fully stabilised and the computerised fire control system includes a laser rangefinder.

## VARIANTS

There are a number of models of the Type 85-II including the Type 85-IIA and the Type 85-IIM. The vehicle is also co-produced in Pakistan as the Type 85-IIAP. Further development of the Type 85 has resulted in the Type 85-111 which has many improvements including a 1000 hp diesel engine. The latest Chinese MBT is the Type 90-11 which weighs 48 t and is at present at the prototype stage. This has been developed in association with Pakistan and is also known as the Khalid, MBT 2000 or P-90.

## STATUS

In production. In service with China and Pakistan.

## MANUFACTURER

Chinese state factories.

## LIGHT TANKS AND MAIN BATTLE TANKS



**Above:**  
**Type 85-IIAP**

**Top right:**  
**Type 85-IIM**

**Left:**  
**Type 85-IIM**

**Right:**  
**Type 85-IIAP**



# NORINCO Type 80 MBT (China)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with splash board running across mid-way up, turret centre and engine compartment at rear. U like Type 59 and Type 69 there is no exhaust outlet on left side of hull above last road wheel station. Long-range fuel drum and unditching beam often carried on hull rear
- Circular turret has curved sides with loader's cupola on right side with externally mounted 12.7mm AA MG, 105mm gun barrel has thermal sleeve and fume extractor, cage type stowage basket around sides and rear of turret. Bank of four smoke grenade dischargers either side of the turret
- Suspension has six road wheels with gap between 1st/2nd and 2nd/3rd road wheels, idler front, drive sprocket rear, track return rollers, upper part of suspension covered by skirt

## SPECIFICATIONS

Crew:	4
Armament:	1 x 105mm, 1 x 7.62mm MG (coaxial), 1 x 12.7mm MG (AA), 2 x 4 smoke grenade dischargers
Ammunition:	44 x 105mm, 2,250 x 7.62mm, 500 x 12.7mm
Length gun forwards:	9.328m
Length hull:	6.325m
Height:	2.29m (turret roof), 2.874m (with AA MG)
Width:	3.372m (overall)
Ground clearance:	0.48m
Weight, combat:	38,000kg
Power-to-weight ratio:	19.2hp/tonne
Engine:	V-12 Model VR36 diesel developing 730hp
Maximum road speed:	60km/hr
Maximum road range:	430km
Fuel capacity:	1,400 lit
Fording:	1.4m
Vertical obstacle:	0.8m
Trench:	2.7m
Gradient:	60%
Side slope:	30%
Armour:	Classified
Armour type:	Steel/composite
NBC system:	Yes
Night vision equipment:	Yes

## DEVELOPMENT

Whilst the earlier Type 69 MBT was a further development of the Type 59 MBT, the Type 80 has a number of new features including a brand new hull. The driver is seated at the front left

with some ready use ammunition to his right, the three man turret is in the centre with the commander and gunner on the left and the loader on the right. The powerpack is at the rear.

The 105mm rifled tank gun fires standard NATO ammunition and can be elevated from -4° to +18° under full power control with turret traverse a full 360°, manual controls are provided for emergency use. A 7.62mm machine gun is mounted coaxial with the main armament and a 12.7mm machine gun is mounted on the turret roof for anti-aircraft defence.

A computerised fire control system is fitted and this includes a laser rangefinder for the gunner. One version has the laser rangefinder installed in the gunner's sight while another has the laser rangefinder mounted over the 105mm gun in a similar manner to that of some versions of the NORINCO Type 69 MBT.

For deep fording, a snorkel can be fitted to the vehicle and a fire detection/suppression system is standard. If required a layer of composite armour can be fitted to the glacis plate for improved battlefield survivability.

## VARIANTS

Type 80-11, this has a number of modifications and is offered with various types of computerised fire control system.

Type 85-11 and Type 85-IIA have a similar chassis to the Type 80 MBT but are fitted with a new turret of welded rather than cast steel construction. As an option, composite armour can be fitted to the turret and hull.

## STATUS

Production probably complete. In service with China and Myanmar.

## MANUFACTURER

Chinese state factories.

## LIGHT TANKS AND MAIN BATTLE TANKS



*Top: Type 80 MBT*

*Above: Type 80 MBT*

*Above right: Type 80 MBT*

*Right: Type 85-11 MBT*



# NORINCO Type 69 MET (China)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with splash-board across upper part, turret centre, slightly raised engine compartment rear. Unditching beam often carried across vertical hull rear
- Circular turret has curved sides, loader's cupola right side with external 12.7mm MG, long-barrelled 100mm gun with externally mounted laser rangefinder above, large infra-red searchlight above and to right of 100mm gun
- Suspension has five road wheels, each of which has five small holes, distinct gap between first and second road wheel, idler front, drive sprocket rear, no track-return rollers, upper part often covered with five-part skin with saw tooth bottom

## SPECIFICATIONS

Crew:	4
Armament:	1 x 100mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (bow), 1 x 12.7mm MG (AA)
Length gun forwards:	8.859m
Length hull:	6.243m
Width over skirts:	3.298m
Width over hull:	3.27m
Height to axis of MG:	2.807m
Ground clearance:	0.425m
Weight, combat:	36,700kg
Power-to-weight ratio:	15.8hp/g
Ground pressure:	0.82kg/cm <sup>2</sup>
Engine:	Type 12150L-7BWV-12diesel developing 580hp at 2,000rpm
Maximum road speed:	50km/hr
Maximum road range:	420 to 440km
Fuel capacity:	935 lit
Fording:	1.4m
Vertical obstacle:	0.8m
Trench:	2.7m
Gradient:	60%
Side slope:	40%
Armour:	100mm (maximum) (estimate)
Armour type:	Steel
NBC system:	Yes
Night vision equipment:	Yes (infra-red for commander, gunner and driver)

## DEVELOPMENT

Type 69 series is a further development by NORINCO (China North Industries Corporation) of the earlier Type 59 and was first seen in public during 1982. It has been exported in significant numbers to Iraq. Layout is conventional, with driver front left, some ammunition to his right, turret centre, engine and transmission rear. Commander and gunner sit left of turret, loader right. Both loader and commander have a cupola.

Type 69 1 has a smooth bore gun. Type 69 II has a rifled gun. Both have powered elevation from -5° to +18° with turret traverse through 360°. Types of ammunition for Type 69 II include HEAT, HE, APDS and APFSDS. A 7.62mm MG is mounted coaxial with main armament and a similar, driver-operated weapon is fixed in glacis plate firing forwards. The 12.7mm AA MG is manned by loader.

Type 69 lays its own smoke screen by injecting diesel fuel into its exhaust pipe on left side of hull above last road wheel station.

In addition there is also a Type 79 MBT with a 105mm gun which is similar to the Type 59/Type 69.

## VARIANTS

Type 80 self-propelled anti-aircraft gun is Chinese equivalent of Soviet ZSU-57-2 but uses Type 69 chassis.

Twin 37mm SPAAG, still at prototype stage, has Type 69 chassis fitted with new two-man turret armed with twin 37mm guns.

Two versions of this system have been developed, one with a radar fire control system and the other a clear weather system.

Type 84 AVLB has Type 69 chassis and hydraulic launching mechanism similar in concept to the German Biber AVLB on Leopard 1 chassis, which launches a bridge 18m long.

Type 653 ARV has Type 69 chassis but turret replaced by superstructure, stabiliser/dozer blade front of hull and hydraulic





crane right side of hull. In service with Chinese Army. Further development has resulted in the Type 80 and Type 85 MBTs (qv).

**STATUS**

In production. In service with Bangladesh, China, Iran, Iraq,

Myanmar, Pakistan (with local production), Thailand and Zimbabwe.

**MANUFACTURER**

Chinese state arsenals.

*Above: Type 69-11*

# NORINCO Type 59 MET (China)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with splash board across upper part, turret centre and slightly raised engine compartment rear. Unditching beam and long-range fuel tanks often carried across vertical hull rear.
- Circular turret has curved sides, loader's cupola on right side, externally mounted 12.7mm AA MG, standard 100mm gun with fume extractor to immediate rear of muzzle. Some vehicles have laser rangefinder externally above main armament
- Suspension has five road wheels, idler front, drive sprocket rear, no track-return rollers

## SPECIFICATIONS

Crew:	4
Armament:	1 x 100mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (bow), 1 x 12.7mm MG (AA)
Ammunition:	34 x 100mm, 3,500 x 7.62mm, 200 x 12.7mm
Length gun forwards:	9m
Length hull:	6.04m
Width:	3.27m
Height:	2.59m
Ground clearance:	0.425m
Weight, combat:	36,000kg
Power-to-weight ratio:	14.44hp/tonne
Ground pressure:	0.8kg/cm <sup>2</sup>
Engine:	Model 12150LV-12 liquid cooled diesel developing 520hp at 2,000rpm
Maximum road speed:	40 to 50km/hr
Maximum range:	420 to 440km
Fuel capacity:	815 lit
Fording without preparation:	1.4m
Fording with preparation:	5.5m
Vertical obstacle:	0.79m
Trench:	2.7m
Gradient:	60%
Side slope:	40%
Armour:	100mm (maximum)
Armour type:	Steel
NBC system:	None
Night vision equipment:	Yes (infra-red for commander, gunner and driver) (retrofitted)

## DEVELOPMENT

In the early 1950s the USSR provided China with a quantity of T-54s and production was subsequently undertaken in China under the designation Type 59.

First production vehicles were identical to the T-54 but had no night vision equipment and no stabiliser for the 100mm gun. Late production Type 59s had a fume extractor for the 100mm gun, weapon stabilisation system and infra-red night vision equipment. More recently, some vehicles have been fitted with a laser rangefinder box mounted externally above the 100mm gun.

Layout is almost identical to the Soviet T-54 but with some internal differences. Driver sits front left with some ammunition to his right, turret centre, loader right. Both commander and loader have a cupola.

Type 59 is armed with a 100mm rifled gun which power-elevates from -4° to +17° (early vehicles had manual elevation), turret traverses through 360°. Ammunition is similar to Soviet T-54/T-55s and includes AP, APC-T, HE, HE-FRAG, HEAT-FS and HVAPDS-T. A 7.62mm MG is mounted coaxial with main armament and a similar, driver-operated weapon is fixed in glacis plate firing forwards. The 12.7mm AA MG is manned by the loader.

Type 59 lays its own smoke screen by injecting diesel fuel into its exhaust pipe left side of hull above last road wheel. To extend its operational range to 600km long-range fuel drums are mounted on hull rear.

Late production vehicles were called Type 59-I.

## VARIANTS

Type 59 with 105mm gun has a 105mm L7/M68 type rifled gun with fume extractor and thermal sleeve and has been in service



*Left; Type 59*

with the Chinese Army since the early 1980s. Referred to as M1984 by the US Army. This is called the Type 59-II.

Type 59 ARV, which may well be a local modification, is a Type 59 with turret removed and armed with 12.7mm AA MG. It is not believed to be fitted with a winch. Many companies have proposed upgrade packages for the Type 59 ranging from simply replacing 100mm gun with 105mm rifled gun to more comprehensive refits including fire-control system, suspension, armour, powerpack and night vision equipment. For trials purposes NORINCO has fitted a 120mm smooth bore gun in a Type 59 MBT.

#### **STATUS**

Production complete. In service with Albania, Bangladesh, Cambodia, China, Democratic Republic of Congo, Iran, Iraq, North Korea, Pakistan, Sudan, Tanzania, Vietnam, Zambia and Zimbabwe.

#### **MANUFACTURER**

Chinese state arsenals.

# NORINCO Type 62 Light Tank (China)

## KEY RECOGNITION FEATURES

- Driver's compartment front, rounded turret centre, engine and transmission rear
- 85mm gun overhangs front of chassis, fume extractor rear of muzzle
- Suspension has five large road wheels, drive sprocket rear, idler front, no track-return rollers, no skirts

## SPECIFICATIONS

Crew: 4

Armament:	1 x 85mm gun, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (bow), 1 x 12.7mm MG (AA)
Ammunition:	47 x 85mm, 1,750 x 7.62mm, 1,250 x 12.7mm
Length gun forwards:	7.9m
Length hull:	5.55m
Width:	2.86m
Height:	2.25m
Ground clearance:	0.42m
Weight, combat:	21,000kg
Power-to-weight ratio:	20.47hp/tonne
Ground pressure:	0.71 kg/cm <sup>2</sup>
Engine:	Liquid-cooled diesel developing 430hp at 1,800rpm
Maximum road speed:	60km/hr
Maximum road range:	500km
Fuel capacity:	730 lit
Fording:	1.3m
Vertical obstacle:	0.7m
Trench:	2.55m
Gradient:	60%
Side slope:	40%
NBC system:	None
Night vision equipment:	None

## DEVELOPMENT

Type 62 is virtually a scaled-down Type 59 MBT and is used in rugged terrain as found in southern China. It has seen action in both the Far East and Africa.

Layout is identical to Type 59s, with driver seated front left, three-man turret centre, commander and gunner left, loader right, engine and transmission rear.

Main armament comprises 85mm gun, probably identical to that fitted to Type 63 light amphibious tank (qv) which fires AP, APHE, HE, HEAT and smoke projectiles. It has an elevation from -4° to +20° with turret traverse 360°. A 7.62mm MG is mounted coaxial to right of main armament and a similar, driver-operated weapon fixed in glacis plate. A 12.7mm Type 54 MG is mounted on turret roof for anti-aircraft defence.

Type 62 lays its own smoke screen by injecting diesel fuel into the exhaust and, more recently, models have been observed with a laser rangefinder over main armament to improve first round hit probability.

In addition to being used by the Chinese Army it is also used by Chinese Marines:

## VARIANTS

No variants.

## STATUS

Production as required. In service with Albania, Bangladesh, China, Democratic Republic of Congo, North Korea, Mali, Sudan, Tanzania and Vietnam.

## MANUFACTURER

Chinese state arsenals.

*Right: Type 62 light tank*



# NORINCO Type 63 Light Amphibious Tank (China)

## KEY RECOGNITION FEATURES

- Hull has vertical sides and rear, almost horizontal glacis plate, nose sloping inwards at about 50°
- Rounded turret in centre with 85mm gun overhanging front, fume extractor slightly to rear of muzzle
- Suspension has six road wheels, drive sprocket rear, idler front, no track-return rollers or skirt

## SPECIFICATIONS

Crew:	4
Armament:	1 x 85mm gun, 1 x 7.62mm MG (coaxial), 1 x 12.7mm MG (anti-aircraft)
Ammunition:	47 x 85mm, 2,000 x 7.62mm, 500 x 12.7mm
Length gun forwards:	8.435m
Length hull:	7.733m
Width:	3.2m
Height:	3.122m (incAAMG), 2.522m (turret top)
Ground clearance:	0.4m
Weight, combat:	18,400kg
Power-to-weight ratio:	21.74hp/tonne
Engine:	Model 12150-L 12-cylinder water-cooled diesel developing 400hp at 2,000rpm

## DEVELOPMENT

Type 63 has a similar hull to the Soviet PT-76 light amphibious tank but is based on automotive components of the Chinese Type 77 series ARC which is covered in the armoured personnel carriers section. Compared with PT-76 Type 63 has a more powerful engine providing greater road speed and improved power-to-weight ratio.

Main armament comprises an 85mm gun firing AP, APHE, HE, HEAT and smoke projectiles, with elevation of +18° and depression of -4°, and turret traverse 360°. The 7.62mm MG is mounted coaxial to right of 85mm gun and a 12.7mm Type 54 MG is mounted on turret roof for anti-aircraft defence.

The vehicle is fully amphibious, propelled in the water by two water jets mounted rear. Before entering the water bilge pumps are switched on and trim vane erected on glacis plate. To extend operational range, additional fuel tanks are installed on rear decking.

Maximum road speed:	64km/hr	<b>VARIANTS</b>
Maximum water speed:	12km/hr	No variants.
Maximum range:	370km	
Fuel capacity:	403 lit	
Fording:	Amphibious	
Vertical obstacle:	0.87m	
Trench:	2.9m	
Gradient:	600%	
Side slope:	30%	
Armour:	14mm(maximum)	
Armour type:	Steel	
NBC system:	Yes	
Night vision equipment:	Yes (infra-red for driver only)	

**STATUS**

Production complete. In service with China, Myanmar, North Korea and Vietnam.

**MANUFACTURER**

Chinese state arsenals.

*Right: Type 63  
light tank*



# GIAT AMX-13 Light Tank (France)

## KEY RECOGNITION FEATURES

- Well-sloped glacis plate, normally with splash-board on lower part, driver front left, engine to his right, flat roof with turret slightly to rear
- Turret is oscillating type, gun in upper part of turret pivots on lower part with canvas cover joining them, commander's domed hatch cover on left side of turret roof, bustle turret extends to rear
- Suspension has five large road wheels, drive sprocket front, idler rear, two or three track-return rollers, no skirts

## SPECIFICATIONS (90MM VERSION)

Crew:	3
Armament:	1 x 90mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft) (optional), 2 x 2 smoke grenade dischargers
Ammunition:	32 x 90mm, 3,600 x 7.62mm
Length gun forwards:	6.36m
Length hull:	4.88m
Width:	2.51m
Height to commander's hatch:	2.3m
Ground clearance:	0.37m
Weight, combat:	15,000kg
Weight, empty:	13,000kg
Power-to-weight ratio:	16.66bhp/tonne
Ground pressure:	0.76kg/cm <sup>2</sup>
Engine:	SOFAM Model 8Gxb 8-cylinder water-cooled petrol developing 250hp at 3,200rpm
Maximum road speed:	60km/hr
Maximum road range:	350 to 400km
Fuel capacity:	480 lit
Fording:	0.6m
Vertical obstacle:	0.65m
Trench:	1.6m
Gradient:	60%
Side slope:	60%
Armour:	25mm (maximum)
Armour type:	Steel
NBC system:	None
Night vision equipment:	Optional

## DEVELOPMENT

Shortly after the Second World War the French Army drew up requirements for three new AFVs including a new light tank. It was subsequently developed by Atelier de Construction d'Issy-les-Moulineaux under the designation AMX-13. First prototypes were completed in the late 1940s, production commencing at Atelier de Construction Roanne in 1952. When production of AMX-30 was under way, production of AMX-13 and its many variants was transferred to Creusot-Loire. Total production of AMX-13 light tank has mounted to over 3,000. (See separate entry for AMX VCI MICV .)

All versions of AMX-13 have similar layout, driver front left, engine to his right and turret to rear. AMX-13 Model 51 was armed with 75mm gun later replaced by 90mm gun with thermal sleeve. A 105mm armed version was built for export. Turret traverses through 360°. Upper part of turret contains main armament, elevates from -5° to +12.5°. FL-10 and FL-12 turrets both oscillating type, commander sits left, gunner right. Automatic loader mounted in turret bustle includes two revolver type magazines, each of which holds six rounds of ammunition, empty cartridge cases ejected from turret bustle. After 12 rounds, magazines have to be reloaded manually.

Wide range of optional equipment available, including passive night vision equipment, additional armour protection, improved fire-control systems and laser rangefinder. A number of companies are offering upgrade packages for AMX-13, including Giat Industries (France), GLS (Germany), NIMDA (Israel) and Singapore Technologies Automotive. AMX-13 can be fitted with other engines including Detroit Diesel, Baudouin and Poyaud.

## VARIANTS

Singapore Technologies Automotive has rebuilt most of the





*Above: AMX-13 with 90mm gun      Right: Alwx-13 with 75mm gun (ECP Armees)*

AMX-13 fleet of the Singapore Army to SMI configuration that includes a new engine, new cooling system and new transmission.

Rocket launcher: Venezuela has AMX-13 chassis with Israeli 160mm LAR multiple rocket launcher.

AMX-13 ARV.

AMX-13 AVLB.

### **STATUS**

Production as required. In service with Argentina, Dominican Republic, Ecuador, Indonesia, Ivory Coast, Lebanon, Peru, Singapore and Venezuela.

### **MANUFACTURERS**

Creusot-Loire Industrie at Chalon sur Saone; Atelier de Construction Roanne, Roanne, France. (GIAT Industries has now taken over Creusot-Loire.)



# GIAT AMX-30 MET (France)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver's hatch in upper left part, turret centre, engine rear, hull rear vertical, silencer on track guard above rear drive sprocket
- Cast turret has sides that slope inwards with turret bustle extending over engine deck, stowage basket each side of turret, two smoke grenade dischargers each side at rear, commander's cupola on right side of turret roof. 105mm gun has thermal sleeve, 20mm cannon mounted left of gun
- Suspension each side has five road wheels, drive sprocket rear, idler front, five track-return rollers, no skirts

## SPECIFICATIONS

Crew:	4
Armament:	1 x 105mm, 1 x 20mm cannon (coaxial), 1 x 7.62 MG (AA), 2 x 2 smoke grenade dischargers
Ammunition:	47 x 105mm, 1,050 x 20mm, 2,050 x 7.62mm
LejrtttMjunJbnvards:	9.48m
Length hull:	6.59m
Width:	3.1m
Height including searchlight:	2.86m
Height to turret top:	2.29m
Ground clearance:	0.44m
Weight, combat:	36,000kg
Weight, empty:	34,000kg
Power-to-weight ratio:	20hp/tonne
Ground pressure:	0.77kg/cm <sup>2</sup>
Engine:	Hispano-Suiza HS 110 12-cylinder water-cooled supercharged multi-fuel developing 720hp at 2,000rpm
Maximum road speed:	65km/hr
Maximum road range:	500 to 600km
Fuel capacity:	970 lit
Fording:	1.3m
Fording with preparation:	2.2m
Fording with snorkel:	4m
Vertical obstacle:	0.93m
Trench:	2.9m
Gradient:	60%
Side slope:	30%
Armour:	80mm (max)

Armour type:	Steel
NBC system:	Yes
Night vision equipment:	Yes (passive on AMX-30 B2)

## DEVELOPMENT

AMX-30 was developed from the mid-1950s by the Atelier de Construction d'Issy-les-Moulineaux to meet the requirements of the French Army. First prototypes were completed in 1960 with production commencing at the Atelier de Construction Roanne (ARE) in 1966, since when over 3,500 AMX-30 MBT and variants have been built for home and export markets. Production of the AMX-30 MBT has been completed and in the French Army it has started to be replaced by GIAT Industries Leclerc MBT.

Driver sits front left with cast turret centre, engine and transmission rear. Commander and gunner sit right of turret, loader left. The 105mm gun power-elevates from -8° to +20°, turret traverses through 360°. Main armament fires APFSDS, HEAT, HE, smoke and illuminating rounds with a 20mm cannon or 12.7mm MG mounted coaxial to the left. The cannon has independent elevation for engaging low-flying aircraft and helicopters. A 7.62mm MG is mounted right of commander's cupola. Some AMX-30 62 MBTs of the French Army have been fitted with explosive reactive armour over their frontal arc.

## VARIANTS

AMX-30D was developed for desert operations with sand shields for its tracks, engine developing 620hp and reduction in gearbox ratios which limits its speed to 60km/hr. AMX-30B2: Modifications include a new fire-control system with laser rangefinder and LLTV as well as automotive improvements. In addition to taking delivery of new build AMX-30B2, the French Army also had many earlier vehicles upgraded

to this standard.

Modernised AMX-30s: A number of countries and companies have developed modernisation packages for AMX-30 MBT, only one has entered production, in Spain.

AMX-30D ARV.

AMX-30 AVLB.

155mm GCT self-propelled howitzer uses AMX-30 chassis (see SPGs).

AMX-30 driver training tank is AMX-30 with turret replaced by observation cupola.

AMX-30 EBG Combat Engineer Tractor.

Roland anti-aircraft missile system.

Shahine anti-aircraft missile system, built for Saudi Arabia.

AMX-30 DCA twin 30mm self-propelled anti-aircraft system.

### STATUS

Production complete. In service with Bosnia, Chile, Croatia, Cyprus, France, Greece, Qatar, Saudi Arabia, Spain, United Arab Emirates and Venezuela.

### MANUFACTURER

GIAT Industries, Roanne, France.



**Above:**  
**AMX-30B2**



**Right:**  
**AMX-30B2**  
**fitted with**  
**explosive**  
**reactive**  
**armour**

# GIAT Leclerc MET (France)

## KEY RECOGNITION FEATURES

- Vertical hull front which then slopes back under front of hull, very well sloped glacis plate, turret centre, slightly raised engine compartment at rear. Hull rear is vertical with horizontal louvres
- Turret front and sides have vertical lower part with chamfer to upper part, distinctive array of periscopes around upper part of forward part of turret roof. Large periscopic sight on left side of turret roof, externally mounted 7.62mm machine gun
- Suspension has six road wheels either side with idler front, drive sprocket rear, and track return rollers. Upper part of suspension is covered by armoured skirts with those above the front two road wheels being thicker

## SPECIFICATIONS

Crew:	3
Armament:	1 x 120mm, 1 x 12.7mm MG (coaxial), 1 x 7.62 MG (AA). 3 x 9 smoke grenade dischargers
Ammunition:	40 x 120mm
Length gun forwards:	9.87m
Length hull:	6.88m
Width:	3.71m
Height:	2.53m (turret roof)
Ground clearance:	0.5m
Weight, combat:	54,500kg
Power-to-weight ratio:	27.52hp/tonne
Ground pressure:	0.9kq/cm <sup>2</sup>
Engine:	SACM V8X 8-cylinder Hyperbar diesel developing 1,500hp
Maximum road speed:	71km/hr (forwards) 38km/hr (reverse)
Maximum road range:	550km
Fuel capacity:	1,300 lit
Fording:	1m
Vertical obstacle:	1.25m
Trench:	3m
Gradient:	60%
Side slope:	30%
Armour:	Classified
Armour type:	Steel/composite/laminate
NBC system:	Yes
Night vision equipment:	Yes (passive)

## DEVELOPMENT

The Leclerc MBT has been developed by GIAT Industries as the replacement for the French Army's existing fleet of AMX-30 B2

series of MBTs. Development started in 1983 and the first of six prototypes was completed in 1989, these were however preceded by a number of test rig vehicles. The first production Leclerc was completed in December 1991 and delivered to the French Army in 1992. In 1993 the United Arab Emirates ordered a total of 436 Leclerc MBTs, including variants.

The Leclerc turrets are assembled by GIAT's Tarbes facility while the chassis is built at Roanne, the latter also integrate the turret with the chassis and then deliver the complete vehicle to the French Army.

The hull and turret of the Leclerc are of advanced modular armour. The driver is seated at the front of the hull on the left with some ammunition stowed to his right. The two man power-operated turret is in the centre with the commander being seated on the left and the gunner on the right. No loader is required as a bustle-mounted automatic loader holds a total of 22 rounds of ready use ammunition. Turret traverse is a full 360° with weapon elevation from -8° to +15° under full power control. A 12.7mm MG is mounted externally on the turret roof and operated by remote control. In either side of the turret are 9 dischargers that can also launch a variety of grenades including smoke and decoy.

The suspension system of the Leclerc is of the hydropneumatic type and standard equipment includes a fire detection/suppression system and if required long-range fuel tanks can be fitted at the rear of the hull to increase operational range.

## VARIANTS

ARV, in production for France and UAE.  
AEV, project.  
AVLB, project.

## LIGHT TANKS AND MAIN BATTLE TANKS



### STATUS

Production. In service with France and the UAE.

### MANUFACTURER

GIAT Industries, Satory, France (see text).

*Above: GIAT Leclerc MBT*

*Above right: GIAT Leclerc for UAE*

*Right: GIAT Leclerc MBT*



# Krauss-Maffei Wegmann Leopard 2 MBT (Germany)

## KEY RECOGNITION FEATURES

- Nose slopes back under hull with 45° glacis plate, then horizontal hull. Driver front right, turret centre and raised engine compartment rear. Vertical hull sides and rear, louvres extending full width of vehicle rear

- Turret has vertical front, sides and rear with bustle extending right over engine compartment, commander's low profile cupola on right with periscopic sight to his front, 120mm gun (with thermal sleeve and fume extractor) has large mantlet with gunner's sight in forward part of turret to immediate right of mantlet

- Suspension each side has seven road wheels, drive sprocket rear, idler front and four track-return rollers. Upper part covered by skirting, front idler and first two road wheels also covered by armoured skirts

## SPECIFICATIONS

Crew:	4
Armament:	1 x 120mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 2 x 8 smoke grenade dischargers
Ammunition:	42 x 120mm, 4,750 x 7.62mm
Length gun forwards:	9.668m
Length hull:	7.722m
Width overall:	3.7m
Height to top of commander's periscopes:	2.787m
Height to turret top:	2.48m
Ground clearance:	0.54m (front), 0.49 (rear)
Weight, combat:	55,150kg
Power-to-weight ratio:	27.27hp/tonne
Ground pressure:	0.83kg/cm <sup>2</sup>
Engine:	MTU MB 873 Ka 501 4-stroke, 12-cylinder multi-fuel, exhaust turbocharged liquid-cooled diesel developing 1,500hp at 2,600rpm
Maximum road speed:	72km/hr
Maximum road range:	550km
Fuel capacity:	1,200 lit
Fording:	1m
Fording with preparation:	2.25m
Fording with snorkel:	4m
Vertical obstacle:	1.1m
Trench:	3m
Gradient:	60%
Side slope:	30%
Armour:	Classified

Armour type:	Laminate/steel
NBC system:	Yes
Night vision equipment:	Yes (passive for commander, gunner and driver)

## DEVELOPMENT

Following cancellation of MBT-70, full-scale development of a new German MBT commenced. First prototypes of this new MBT were completed by Krauss-Maffei (which became Krauss-Maffei Wegmann in 1998) between 1972 and 1974, some armed with a 105mm gun and some with a 120mm. With further improvements it became the Leopard 2, and in 1977 Krauss-Maffei was selected as prime contractor and an order for 1,800 vehicles placed, 810 of which were built by MaK and the remainder by Krauss-Maffei. First production vehicles were completed in 1979 with the last of 2,125 vehicles for the German Army delivered in 1992.

In 1979 the Dutch Army ordered 445 Leopard 2s which were all delivered by 1986, and in 1983 Switzerland selected the Leopard 2 with 35 from Germany and the remaining 345 to be built in Switzerland. More recently, Leopard 2 has been selected by Spain and Sweden.

Layout is conventional with driver front right, turret centre and engine and transmission rear. Commander sits on right of turret, gunner to his front and loader left. The 120mm smooth bore gun fires APFSDS-T and HEAT multi-purpose rounds and power-elevates from +20° to -9°, with powered traverse through 360°. Main armament is stabilised in both elevation and traverse.

## VARIANTS

Buffel armoured recovery vehicle  
Leopard 2 (Improved) is an upgrade of earlier Leopard 2 with

## LIGHT TANKS AND MAIN BATTLE TANKS



*left: Leopard 2 of  
Netherlands Army  
(Richard  
Stickland)*

*Above: Leopard 2*

*Below: Leopard 2  
Netherlands Army  
(Richard Stickland)*

many improvements including additional armour over frontal arc. Some Leopard 2s of German and Netherlands are being upgraded to this standard. Spanish and Swedish Leopard 2s are being built brand new to this standard.

Leopard 2 driver-training vehicle, turret replaced by observation type turret (used by Germany and Netherlands).

### STATUS

In production. In service with Austria, Denmark, Germany, Netherlands, Spain, Sweden and Switzerland.

### MANUFACTURERS

Krauss-Maffei Wegmann, Munich, Germany; MaK, Kiel, Germany; Federal Construction Works, Thun, Switzerland (licensed production).





## Krauss-Maffei Wegmann Leopard 2 MBT (Germany)







*Above: Leopard 2 Improved (Leopard 2A5) of German Army*



*Above right: Leopard 2 Improved (Strv 122) of Swedish Army*

*Right: Leopard 2 Improved (Strv 122) of Swedish Army*

*Left: Leopard 2 Improved (Strv 122) of Swedish Army*



# Krauss-Maffei Wegmann Leopard 1 MBT (Germany)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate leads up to horizontal hull top extending right to rear of hull, driver's hatch in right side of roof to immediate rear of glacis plate, turret centre, engine rear, hull rear slopes slightly inwards. Hull sides above suspension slope inwards with horizontal louvers above rear drive sprocket
- Cast turret with sides sloping inwards, external mantlet and 105mm gun with thermal sleeve and fume extractor, infra-red/white light searchlight often mounted above gun mantlet, stowage basket on turret rear, smoke grenade dischargers on turret sides towards rear
- Suspension each side has seven road wheels, idler front, drive sprocket rear, four track-return rollers. Upper part often covered by skirts

## SPECIFICATIONS

Crew:

Armament: 1 x 105mm, 1 x 7.62mm MG (coaxial), 1 x 7.62 MG (anti-aircraft), 2 x 4 smoke grenade dischargers

Ammunition: 60 x 105mm, 5,500 x 7.62mm

Length gun forwards: 9.543m

Length hull: 7.09m

Width without skirts: 3.25m

Height to top of commander's periscope: 2.764m

Ground clearance: 0.44m

Weight, combat: 42,400kg

Weight, empty: 40,400kg

Power-to-weight ratio: 19.57hp/tonne

Ground pressure: 0.88kg/cm<sup>2</sup>

Engine: MTU MB 838 Ca M500, 10-cylinder multi-fuel developing 830hp at 2,200rpm

Maximum road speed: 65km/hr

Maximum road range: 600km

Fuel capacity: 985 lit

Fording: 2.25m

Fording with preparation: 4m

Vertical obstacle: 1.15m

Trench: 3m

Gradient:

Armour: 70mm (maximum)

Armour type: Steel

NBC system: Yes

Night vision equipment: Yes (was infra-red, now replaced by passive in some armies)

## DEVELOPMENT

Leopard 1 was developed from the late 1950s and after trials with various prototypes, Krauss-Maffei (now Krauss-Maffei Wegmann) of Munich was selected as prime contractor in 1963, with MaK responsible for the specialised versions.

First production Leopard 1 was delivered to the German Army in 1965 and production continued, with interruptions, until 1984. OTOBREDA produced Leopard 1 for the Italian Army, and MaK built a small quantity for both home and export markets.

Driver sits front right with NBC pack and some ammunition to his left, turret centre, engine and transmission rear. Commander and gunner sit on right side of turret, loader left.

The 105mm gun is fully stabilised and it power-elevates from -9° to +20° with turret traverse 360°. Types of ammunition include APDS, APFSDS, HEAT and smoke. A 7.62mm MG is mounted coaxial to left of 105mm gun and a similar weapon can be mounted on commander's or loader's hatch.

A wide range of optional equipment is available including additional armour, different fire-control systems, various night vision devices and a dozer blade. Many armies, including Germany, have already upgraded their Leopard 1s to extend their lives into the 21st century.

## VARIANTS

Leopard 1A1A1 has a number of improvements including additional armour protection for the turret.

Leopard 1A2 has passive night equipment for commander and driver and improved turret.

Leopard 1A3 has new all-welded turret with improved armour, as well as all the improvements of Leopard 1A2 and 1A3.

Leopard 1A4 was the final model for the German Army and has

## LIGHT TANKS AND MAIN BATTLE TANKS

all-welded turret and integrated fire-control system.

Leopard 1A5 is latest upgrade for German Army and has new computerised fire control system and thermal night vision equipment.

Leopard 1 with 105mm Improved Weapon System, trials only.

Leopard 1 with 120mm gun of Leopard 2, trials only.

Leopard 1 AVLB (Biber).

Leopard 1 ARV.

Leopard 1 AEV.

Gepard twin 35mm anti-aircraft system.

Leopard 1 driver training tank has large observation type cupola in place of turret.

Leopard 1 chassis has also been proposed as carrier for the Roland surface-to-air missile system, Italian 76mm OTOMATIC anti-aircraft/anti-helicopter weapon and turret of French GCT 155mm self-propelled gun, but none has entered service.

Leopard mineclearing vehicle (Norway)

Leopard AEV (Norway)

Leopard artillery observation vehicle (Germany)

### STATUS

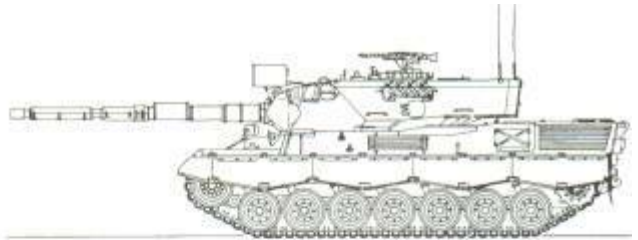
Production complete but resumed if further orders. In service with Australia, Belgium, Brazil, Canada, Chile, Denmark, Germany, Greece, Italy, Netherlands, Norway and Turkey.

### MANUFACTURERS

Krauss-Maffei Wegmann, Munich, and MaK, Kiel, Germany; OTOBREDA, La Spezia, Italy.

*Right:  
Leopard 1A5*

*Below:  
Leopard 1As.*



# Krauss-Maffei Leopard 1 MBT (Germany)







*Left: Leopard 1A2*

*Above: Leopard 1A4 (Krauss Maffei)*

# Arjun MET (India)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with V type splash deflector on front of hull leads up to horizontal hull top with raised engine decks at rear
- 120 mm gun has thermal sleeve and fume extractor and is mounted in vertical gun mantlet, vertical turret front angled to rear with turret sides also vertical
- Suspension either side consists of seven road wheels with drive sprocket at rear, idler rear and track return rollers. Armoured skirt covers upper part of forward hull sides with rubber flap covering remainder

## SPECIFICATIONS

Crew:	4
Armament:	1 x 120mm gun, 1 x 7.62mm MG (co-axial), 1 x 12.7mm MG (anti aircraft), 2 x 9 smoke grenade launchers
Ammunition:	39 x 120mm, 3,000x7.62mm (estimate), 1,000 x 12.7mm (estimate)
Length gun forwards:	10.194m
Length hull:	n/available
Width:	3.847m
Height:	2.32m
Ground clearance:	0.45m
Weight, combat:	58,500kg
Weight, empty:	56,500kg (estimate)
Power-to-weight ratio:	23.93 hp/tonne
Ground pressure:	0.84kg/cm
Engine:	MTU 838 Ka 501 12-cylinder liquid-cooled diesel developing 1,400 hp at 2,500 rpm
Maximum road speed:	72 km/h
Maximum road range:	450km
Fuel capacity:	1,610 litres
Fording:	1m (estimate)
Vertical obstacle:	0.90m
Trench:	2.43m
Gradient:	77o/o
Side slope:	40%
Armour:	Classified
Armour type:	Steel/composite
NBC system:	Yes
Night vision equipment:	Yes

## DEVELOPMENT

Early in the 1970s, following its experience in licenced production of the 105mm armed Vickers Defence Systems Mk 1 (locally known as the Vijayanta) MBT, a decision was taken to design a new MBT in India which became known as the Arjun.

This was designed by the Combat Vehicle Research and Development Establishment with the assistance of many other facilities in India as well as in the private sector in India and overseas.

The first prototype of the Arjun was completed in 1984 and since then a total of 12 prototypes and 32 pre-production vehicles have been built at the Heavy Vehicles Factory at Avadi where production of the Vijayanta and more recently, the Russian T-72M1 (called Ajeya) has been undertaken.

The layout of the Arjun is conventional with the driver's compartment at the front on the right side, turret in centre with commander and gunner on right and loader on left with the powerpack at the rear. The 120mm rifled tank gun is fully stabilised and fires one piece ammunition. A 7.62mm machine gun is mounted co-axial with the main armament and a 12.7mm machine gun is mounted on the turret roof for air defence purposes.

Standard equipment includes a computerised fire control system, day/night sighting system, NBC system and long range fuel drums mounted at the rear of the hull.

## VARIANTS

A number of variants of the Arjun have been projected including armoured recovery vehicle, engineer tank, armoured vehicle launched bridge and air defence platform. For trials purposes the chassis of the Arjun has been fitted with the South African T6 155 mm/52 calibre turret with the complete



system being called the Bhim by the Indian Army.

**STATUS**

Prototypes. Not yet in production.

**MANUFACTURER**

Heavy Vehicles Factory,  
Avadi, India.



*Right: Arjun MBT*

# Zulfiqar MBT (Iran)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate leads up to horizontal hull top which extends to the rear. Hull rear is vertical with two circular e. haust outlets
- Large turret positioned slightly towards the front of the chassis with front sloping inwards top and bottom, hull sides vertical and basket mounted on vertical turret rear. Main armament has fume extractor mounted mid way down barrel
- Suspension either side consists of seven road wheels with drive sprocket at rear, idler at front and five track return rollers. No side skirts have been observed so far

## SPECIFICATIONS

Crew:	3
Armament:	1 x 125mm gun, 1 x 1 x 7.62mm MG (co-axial) and probably 1 x 12.7mm MG (anti-aircraft)
Ammunition:	classified
Length gun forwards:	classified
Length hull:	classified
Width without skirts:	classified
Height:	classified
Ground clearance:	classified
Weight, combat:	40,000kg (estimate)
Weight, empty:	38,000kg (estimate)
Power-to-weight ratio:	25 hp/tonne
Ground pressure:	classified
Engine:	diesel.1000hp
Maximum road speed:	70km/h
Maximum road range:	500km (estimate)
Fuel capacity:	Classified
Fording with preparation:	Classified
Vertical obstacle:	Classified
Trench:	classified
Gradient:	60%
Side slope:	30%
Armour:	Classified
Armour type:	Steel/composite
NBC system:	Yes
Night vision equipment:	Yes

## DEVELOPMENT

The existence of the Zulfiqar MBT was first revealed in 1994 when it was stated that the vehicle had been developed in Iran by the Islamic Revolutionary Guards Corps. After trials with three different generations of prototype vehicles, production of the Zulfiqar MBT is said to have commenced in 1999.

The layout of the Zulfiqar MBT is conventional with the driver's compartment at the front, turret in centre and powerpack at the rear. The 125mm gun and its associated automatic loading system is understood to be from the Russian T-72 MBT which is also manufactured in Iran. The automatic loader has enabled the crew of the vehicle to be reduced to three: commander, gunner and driver.

Standard equipment is said to include a computerised fire control system, day/night sights, NBC system and fire detection and suppression system.

## VARIANTS

There are no known variants of the Zulfiqar MBT. Other Iranian MBT projects include local production/assembly of the Russian T-72 and an upgraded T-54/T-55/Type 59 MBT called the Type 72Z. This features a new powerpack, computerised fire control system, day/night sighting system and the replacement of the existing 100mm rifled tank gun by a NATO standard 105mm L7/M68 rifled tank gun. Another upgraded T-54/T-55 MBT is called the Safir-74. This features the latest generation of explosive reactive armour which provides protection from chemical energy and kinetic energy attack. This explosive reactive armour is installed on the glacis plate, nose, turret front and sides and skirts and is very similar in appearance to the latest Russian explosive reactive armour.



**STATUS**

Zulfiqar is now in production and entering service with Iran.

**MANUFACTURER**

Defence Industries  
Organisation, Shahid Dooz  
Industrial Complex, Iran.



*Right: Zulfiqar MBT  
with turret  
traversed to rear*

## Merkava MBT (Israel)

KEY RECOGNITION FEATURES	SPECIFICATIONS (MK 1)
Crew:	4
• Almost vertical hull front, well sloped glacis plate with distinct bulge in right side for engine. Horizontal hull top	Armament: 1 x 105mm, 1 x 7.62mm MG (coaxial), 2 x 7.62 MG (anti-aircraft), 1 x 60mm mortar Ammunition: 62 x 105mm, 10,000 x 7.62mm
hatch forward of turret on left side	Length hull: 7.45m Width: 3.7m
• Turret mounted slightly to rear of vehicle with distinctive pointed front 105mm gun with thermal sleeve and fume extractor, large turret bustle with stowage rack that extends to hull rear, entry hatch in vertical hull rear	Height to commander's cupola: 2.75m Height to turret roof: 2.64m Ground clearance: 0.47m Power-to-weight ratio: 14.28hp/tonne Weight, combat: 60,000kg Weight, empty: 58,000kg Ground pressure: 0.9kg/cm <sup>2</sup> Engine: General Dynamics Land Systems AVDS-1790-6AV-12diesel developing 900hp
• Suspension each side has six road wheels, drive sprocket front, idler rear and four track-return rollers. Upper part of suspension covered by skirts with wavy bottom.	Maximum road speed: 46km/hr Maximum range: 400km Fuel capacity: 1250 lit Gradient: 70% Side slope: 38% Armour: Classified Fording: 1.38m, 2m (with preparation) Vertical obstacle: 0.95m Trench: 3m Armour type: Steel/spaced/laminate NBC system: Yes Night vision equipment: Yes

### *Right: Merkava Mk 2 (Israeli MoD)*

#### **VARIANTS**

Merkava Mk 2 entered production in 1983 and has several improvements, including improved armour protection and fire-control system.

Merkava Mk 3 is current production model and was first shown in 1989. Has many improvements including a 120mm smooth bore gun, more powerful 1200hp engine coupled to a new transmission, new armour, threat warning system, new suspension and improved fire control system. The prototype of a 155mm self-propelled artillery system, called the Slammer, has been built but not placed in production.

#### **STATUS**

In production. In service with Israeli Army only.

#### **MANUFACTURER**

Israel Ordnance Corps facility at Tel a Shomer, Israel.



# IVECO/OTOBREDA Ariete MET (Italy)

## KEY RECOGNITION FEATURES

- Turret front slopes well to rear, 120mm gun in internal mantlet, flat roof with commander's cupola on right side with large periscopic sight to front, vertical turret sides with bank of four smoke grenade dischargers either side, ammunition hatch in left side of turret, gunner's sight in forward part of turret roof on right side
- Hull sides vertical, raised engine compartment at back with louvres above each side of last road wheel station
- Suspension either side has seven road wheels, idler front, drive sprocket rear and track return rollers. Upper part of suspension is covered by skirts

## SPECIFICATIONS

Crew:	4
Armament:	1 x 120mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 2 x 4 smoke grenade dischargers
Ammunition:	40 x 120mm, 2400 x 7.62mm
Length overall:	9.669m
Length hull:	7.59m
Width overall:	3.601m
Height to turret roof:	2.5m
Ground clearance:	0.44m
Weight, combat:	54,000kg
Power-to-weight ratio:	24hp/tonne
Ground pressure:	0.85kg/cm <sup>2</sup>
Engine:	IVECOV-12 MTCA 12-cylinder turbo-charged diesel developing 1300hp at 2,300rpm
Maximum road speed:	65+km/h
Maximum range:	550+km
Fuel capacity:	Not available
Fording:	1.2m (without preparation); 2.1m (with preparation)
Vertical obstacle:	1m
Trench:	3m
Gradient:	60%
Side slope:	30%
Armour:	Classified
Armour type:	Steel/composite
NBC system:	Yes
Night vision equipment:	Yes (passive)

## DEVELOPMENT

In 1984 the now OTOBREDA and IVECO formed a consortium to develop a new family of vehicles for the Italian Army, the Centauro (8x8) tank destroyer (qv), the Ariete MBT and the Dardo infantry fighting vehicle (qv). OTOBREDA developed the MBT with IVECO providing the powerpack and other automotive components. The Italian Army has placed an order for 200 Ariete MBTs which are being built at the OTOBREDA facility at La Spezia with IVECO supplying automotive components.

The layout of the Ariete MBT is conventional with the driver at the front right, power operated turret in the centre with commander and gunner on right and loader on left, and powerpack at the rear.

The Galileo computerised fire control fire system, which shares many components with the fire control system installed in the tank destroyer (already in production and service with the Italian Army) includes day/night sights and a laser rangefinder. The tank commander has a stabilised roof-mounted sight. The 120mm smooth bore gun fires the same ammunition as the Leopard 2 and M1A1/M1A2 MBTs with weapon elevation being from -9° to +20° and turret traverse a full 360°. The main armament is fully stabilised with the ordnance being provided with a fume extractor, muzzle reference system and thermal sleeve. The Ariete Mk 2 MBT is currently under development.

**VARIANTS** None.

**STATUS** Production. In service with Italian Army.

## MANUFACTURER

OTOBREDA, La Spezia, Italy (but see text).

## LIGHT TANKS AND MAIN BATTLE TANKS



*Left: Ariete MBT*

*Above: Ariete MBT*

*Below left: Ariete MBT*

*Below: Ariete MBT*



# OTOBREDA OF-40 MET (Italy)

## KEY RECOGNITION FEATURES

- Well-sloped glacis plate leading up to horizontal hull roof. Driver's position front right, turret centre and slightly raised engine compartment rear

- Turret has wedge-shaped mantlet and 105mm gun with thermal sleeve and fume extractor. Almost vertical turret sides, large bustle rear with stowage basket each side. Commander's cupola right with prominent periscopic sight in front

- Hull sides vertical. Suspension has seven road wheels, idler front, drive sprocket rear and five track-return rollers. Upper part of suspension is normally covered by skirts. Exhaust outlets each side at hull rear with horizontal louvers

## SPECIFICATIONS

Crew:	4
Armament:	1 x 105mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 2 x 4 smoke grenade dischargers
Ammunition:	57 x 105mm, 5,700 x 7.62mm
Length gun forwards:	9.222m
Length hull:	6.893m
Width with skirts:	3.51m
Height with sight:	2.68m
Height to turret top:	2.45m
Ground clearance:	0.44m
Weight, combat:	45,500kg
Weight, empty:	43,100kg
Power-to-weight ratio:	18.24hp/tonne
Ground pressure:	0.92kg/cm <sup>2</sup>
Engine:	MTU MB 838 Ca M500V10 supercharged diesel developing 830hp at 2,200rpm
Maximum road speed:	60km/hr
Maximum range:	600km
Fuel capacity:	1,000 lit
Fording:	1.2m (without preparation), 2.25m (with preparation), 4m with snorkel
Vertical obstacle:	1.1m
Trench:	3m
Gradient:	60%
Armour:	Classified
Armour type:	Steel
NBC system:	Yes
Night vision equipment:	Optional

## DEVELOPMENT

OF-40 was designed as a private venture specifically for the export market from 1977, with OTOBREDA responsible for the overall design and production and FIAT for the powerpack. The first prototype was completed in 1980 and in 1981 the United Arab Emirates took delivery of the first of 18 Mk 1s. This was followed by a second order for 18 Mk 2s and three armoured recovery vehicles, all of which have been delivered. The original Mk 1s have now been brought up to Mk 2 standard.

Layout is similar to Leopard 1s with which it shares some components, driver front right, ammunition and NBC pack left, turret centre and engine and transmission rear. Commander and gunner sit right of turret, loader left.

Main armament comprises a 105mm rifled gun that fires standard NATO ammunition and power-elevates from -9° to +20°, with turret traverse 360°. A 7.62mm MG is mounted coaxial left of the main armament, and a 7.62mm or 12.7mm MG is mounted on turret roof for anti-aircraft defence. Fire-control system includes laser rangefinder and stabilised day/night roof sight for commander.

## VARIANTS

OF-40 Mk 2 has the Galileo OG14L2A fire-control system which includes stabilisation system for 105mm gun and a LLTV camera mounted on the turret mantlet and aligned to the 105mm gun.

OF-40ARV.

OF-40 chassis can be used for other weapons systems, such as the twin 35mm anti-aircraft turret, and with a different engine it is used for the Palmaria 155mm self-propelled howitzer and the OTO 76/62 76mm anti-aircraft tank, which is still at prototype stage. The Palmaria has entered production and

## LIGHT TANKS AND MAIN BATTLE TANKS



details are given in the Self-propelled guns and howitzers section.

### STATUS

Production complete. In service with United Arab Emirates only

### MANUFACTURER

OTOBREDA, La Spezia, Italy



*Above; OF-40 Mk 2*



*Above:  
OF-40 Mk 2*

*Right: OF-40  
Mk 2*



# Mitsubishi Heavy Industries Type 90 MBT (Japan)

## KEY RECOGNITION

### FEATURES

- Well sloped glacis plate which is almost horizontal, hull top horizontal and slightly raised at the rear, hull rear vertical with horizontal louvers
- Turret has vertical sides and rear with distinct chamfer between turret front and sides, commander's cupola on right with large gunner's sight in left side of roof, 120mm gun has thermal sleeve with fume extractor
- Suspension either side has six road wheels, idler front, drive sprocket rear, and track return rollers. Upper part of suspension covered by skirts

## SPECIFICATIONS

Crew: 3

Armament:

1 x 120mm, 1 x 7.62mm MG (coaxial), 1 x 12.7mm MG (anti-aircraft), 2 x 3 smoke grenade  
dischargers

Ammunition:

Not available

Length gun forwards: 9.755m

Length hull: 7.5m

Width: 3.43m

Height: 2.34m

Ground clearance: 0.45m (variable)

Weight combat: 50,000kg

Power-to-weight ratio: 30hp/tonne

Ground pressure: 0.89kg/cm<sup>2</sup>

Engine:

Mitsubishi 10ZG 10-cylinder water-cooled diesel engine developing  
1,500hp at 2,400rpm

Maximum road speed: 70km/h (forwards); 42km/h (reverse)

Range: 400km (approx)

Fuel capacity: 1,100 lit

Fording:

Vertical obstacle: 1m

Trench: 2.7m

Gradient: 1,0,....

Side slope: 30%

Armour: Classified

Armour type: Steel/composite/laminate

NBC system: Yes

Night vision equipment: Yes (passive)

## DEVELOPMENT

In the mid-1970s the Japanese Self-Defence Agency started development work on a new MBT to meet the requirements of the Japanese Ground Self-Defence Force. This was known as the TK-X MBT and the first prototypes were completed in the mid-1980s. This was subsequently accepted for service as the Type 90 MBT with first production vehicles completed in 1992.

Prime contractor is Mitsubishi Heavy Industries, with Japan Steel Works being responsible for the 120mm smooth bore gun which is essentially the German Rheinmetall weapon made under licence with the computerised fire control system being developed by Mitsubishi Electric.

The driver's compartment is at the front, turret in the centre and powerpack at the rear. The commander is seated on the





right of the turret with the gunner on the left, no loader is required as an automatic loading system is provided for the 120mm smooth bore gun which fires HEAT-MP and APFSDS-T rounds with a semi-combustible cartridge case.

The computerised fire control system allows either the commander or gunner to aim and fire the main armament whether the Type 90 is moving or stationary with a high probability of a first round hit. A 7.62mm machine gun is mounted co-axial with the main armament with a 12.7mm machine gun being mounted on the roof for anti-aircraft purposes. A laser detector is mounted on the forward part of the roof and a dozer blade can be mounted at the front of the hull.

### Variants

Type 90 ARV is based on the chassis of the Type 90 MBT and has a new superstructure with crane mounted, at front right, dozer/stabiliser blade at front of hull and hydraulically operated winch.

Type 91 AVLB is based on chassis of Type 90 MBT and has scissors type bridge.

### Status

Production. In service with Japanese Ground Self-Defence Force.

### MANUFACTURER

Mitsubishi Heavy Industries, Tokyo, Japan.

*Left: Type 90 MBT*

*fitted with dozer blade*  
*(Kensuke Ebata)*

*Right: Type 90 MBT*  
*(Paul Beaver)*



# Mitsubishi Heavy Industries Type 74 MET (Japan)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver's hatch upper left side, turret slightly forward of hull centre, engine compartment rear. Hull sides slope inwards with exhaust pipes each side at rear. Vertical hull rear
- 105mm gun has fume extractor but no thermal sleeve, prominent external mantlet, cast turret with well sloped sides, stowage basket rear, large infra-red searchlight left of main armament
- Suspension has five road wheels, drive sprocket rear, idler front, no track-return rollers. Suspension can be raised or lowered to give a ground clearance of 0.2 to 0.65m

## SPECIFICATIONS

Crew:	4
Armament:	1 x 105mm, 1 x 7.62mm MG (coaxial), 1 x 12.7mm MG (anti-aircraft), 2 x 3 smoke dischargers
Ammunition:	55 x 105mm, 4,500 x 7.62mm, 660 x 12.7mm
Length gun forwards:	9.42m
Length hull:	6.7m
Width:	3.18m
Height including AA MG:	2.67m
Height to turret top:	2.48m
Ground clearance:	0.2 to 0.65m (adjustable)
Weight, combat:	38,000kg
Weight, empty:	36,300kg
Power-to-weight ratio:	18.94hp/tonne
Ground pressure:	0.86kg/cm <sup>2</sup>
Engine:	Mitsubishi IOZFT Type 22 WT 10-cylinder air-cooled diesel developing 720hp at 2,200rpm
Maximum road speed:	60km/h
Maximum range:	400km
Fuel capacity:	950 lit
Fording:	1m
Fording with preparation:	2m
Vertical obstacle:	1m
Trench:	2.7m
Gradient:	60%
Armour:	Classified
Armour type:	Steel
NBC system:	Yes
Night vision equipment:	Yes

## DEVELOPMENT

Development of a new MBT to supplement the Type 61 (which is now being phased out of service) commenced in the early 1960s with first prototypes completed in 1969. This was followed by a number of further prototypes and first production Type 74s were completed in 1975. Production of the Type 74 has now been completed after about 870 had been built. It was followed in production by the 120mm-armed Type 90 (qv) which was also designed and built by Mitsubishi Heavy Industries.

Layout is conventional with driver front left, turret centre, engine and transmission rear. Commander and gunner sit on turret right, loader left. Commander's cupola is raised above roof line for all-round visibility.

105mm gun is the British L7, made under licence in Japan, which power-elevates from -6° to +12° (-12° to +15° using suspension). The driver can adjust the suspension to suit the type of ground, raise or lower the front or rear, or tilt the tank from side to side.

7.62mm MG is mounted coaxial with main armament and a 12.7mm M2 HB MG is mounted on turret roof for anti-aircraft defence. Some vehicles have been fitted with a dozer blade.

## VARIANTS

Type 78 armoured recovery vehicle and Type 87 twin 35mm self-propelled anti-aircraft gun system.

## STATUS

Production complete. In service with Japanese Ground Self Defence Force only.

## MANUFACTURER

Mitsubishi Heavy Industries, Tokyo, Japan.



Above: Type 74 (Paul Beaver)



Left: Type 74  
(Kensuke Ebata)

# Al Khalid MBT 2000 MBT (Pakistan)

## KEY RECOGNITION FEATURES

- Almost horizontal glacis plate, turret centre and slightly raised engine compartment to the rear, 125 mm gun has thermal sleeve and fume extractor mid-way down barrel
- Large explosive reactive armour panels are fitted on turret front, sides and rear, glacis plate, nose and side skirts. The suspension either side consists of six road wheels with idler at front, drive sprocket at rear and track return rollers which are covered by skirt
- Turret has sloping front with vertical sides and six smoke grenade launchers either side, stowage basket at rear, 12.7 mm MG on right side of turret roof

## SPECIFICATIONS

Crew:	3
Armament:	1 x 125mm, 1 x 7.62mm co-axial, 1 x 12.7mm MG anti-aircraft), 2 x 6 smoke grenade launchers
Ammunition:	39 x 125mm, 500 x 12.7mm and 3,000 x 7.62mm
Length gun forwards:	10.067m
Length hull:	6.9m
Width :	3.4m
Height:	2.3m
Ground clearance:	0.45m
Weight, combat:	45,500 kg
Weight, empty:	43,500 kg estimate)
Power-to-weight ratio:	26.66 hp/tonne
Ground pressure:	n/available
Engine:	8-cylinder, 4 stroke, water-cooled turbocharged diesel developing 1,200hp
Maximum road speed:	70 km/h
Maximum road range:	400km
Fuel capacity:	n/available
Fording:	1.4()in
Fording with preparation:	5m
Vertical obstacle:	0.81,111
Trench:	3m
Gradient:	60%
Side slope:	40%
Armour:	Classified
Armour type:	Steel/composite
NBC system:	Yes
Night vision equipment:	Yes

## DEVELOPMENT

The Al Khalid, also known as MBT 2000, is a joint development between China North Industries Corporation (NORINCO) and Pakistan under an agreement signed in 1988. This covered the upgrading of the existing Type 59 as well as local manufacture of the Type 69-II, Type 85 and finally Al Khalid series of MBT. Production of the Al Khalid started in 1999 with first production vehicles expected to be completed in 2000.

The layout of the Al Khalid is conventional with the driver's compartment at the front, fighting compartment in the centre and engine compartment at the rear. The 125mm smooth bore gun is fed by an automatic loader which first loads the projectile and then the charge. This feature has enabled the crew to be reduced to three: commander, gunner and driver.

Standard equipment includes computerised fire control system, stabilised day/night sighting devices for commander and gunner, NBC system and explosive reactive armour for a higher level of battlefield survivability. A snorkel can be fitted for deep fording.

NORINCO markets a similar vehicle called the Type 90-II MBT which has been developed for the export market.

## VARIANTS

There are no known variants of the Al Khalid MBT.

## STATUS

In production for Pakistan.

## MANUFACTURER

Heavy Industries Taxila, Taxila, Pakistan.



*Al Khalid MET*

## PT-91 MET (Poland)

### KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver's position top centre, turret centre of hull, engine compartment rear, exhaust outlet on left side of hull above last road wheel.
- Hull front, turret front and sides are covered in closely packed explosive reactive armour arrays. Circular turret with raised cupola on right side with externally mounted 12.7 mm MG. 125 mm main gun has thermal sleeve and fume extractor.
- Suspension each side has six road wheels, drive sprocket rear, idler front and three track return rollers. Upper part of suspension is covered by side skirt with closely packed explosive reactive armour

### SPECIFICATIONS

Crew:	3
Armament:	1 x 125mm, 1 x 7.62mm MG (coaxial), 1 x 12.7mm (anti-aircraft), 2 x 12 smoke grenade launchers
Ammunition:	42 x 125mm, 2000 x 7.62mm, 300 x 12.7mm
Length gun forwards:	9.67m
Length hull:	6.95m
Width:	3.59m
Height:	2.19m (turret top)
Ground clearance:	0.395m
Weight, combat:	45,300kg
Power-to-weight ratio:	18.76hp/t
Engine:	Type S-12U supercharged diesel developing 850 hp at 2300 rpm
Maximum road speed:	60km/h
Maximum road range:	650km
Fuel capacity:	1000l
Fording:	1.4m
Vertical obstacle:	0.85m
Trench:	2.8m
Gradient:	60%
Side slope:	400/0
Armour:	Classified
Armour type:	Steel/laminate/ERA
NBC:	Yes
Night vision equipment:	Yes

### DEVELOPMENT

For many years Poland manufactured the Russian T-72M1 series MBT under licence for both the home and export markets. Further development of this resulted in the PT-91 which is also referred to as the *Twardy* (Hard). First prototype was completed in 1992 and a small batch has been built for the Polish Army. The layout of the PT-91 is identical to the T-72 MBT with driver front, turret in centre and powerpack at the rear. The gunner is seated on left of turret and commander on right. Turret can be traversed through 360 degrees with weapon elevation from -6 to +13 degrees.

Main improvements over the T-72 include a new Polish-developed explosive reactive armour package to the hull and turret, laser warning system, installation of a computerised fire control system, bank of 12 electrically operated smoke grenade launchers either side of the turret, increased protection against mines and more powerful engine.

### VARIANTS

Poland also builds a number of variants on the T-72M1 MBT chassis including the T-72M1K commanders tank, WZT-3 armoured recovery vehicle, MID armoured engineer vehicle PMC-90 armoured vehicle launched bridge, and a driver training tank.

### STATUS

Production. In service with Poland.

### MANUFACTURER

ZakładyMechaniczneBumar-LabedySA, Poland.





*Above:*  
*PT-91*

*Top right:*  
*PT-91*

*Left:*  
*PT-91*

*Right:*  
*PT-91*



# TM-800 Medium Tank (Romania)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with splash board across upper part with headlamps to right, turret centre and slightly raised engine compartment to the rear. Unditching beam and long range fuel tanks often carried at rear
- Circular turret has curved sides, loader's cupola on right side with externally mounted 12.7mm AAMG, MG ammunition boxes on turret sides
- Suspension has six road wheels each side, idler front, drive sprocket rear, upper part of suspension covered by skirt

## SPECIFICATIONS

Crew:	4
Armament:	1 x 100mm, 1 x 7.62mm MG (coaxial), 1 x 12.7mm (anti-aircraft), 2 x 5 smoke grenade launchers
Ammunition:	43 x 100mm, 3500 x 7.62mm, 500 x 12.7mm
Length gun forwards:	9.00m
Length hull:	6.74m
Width:	3.30m
Height:	2.35m (turret top)
Ground clearance:	0.425m
Weight, combat:	45,000kg
Power-to-weight ratio:	18.45 hp/tonne
Engine:	diesel developing 830hp
Maximum road speed:	64km/h
Maximum road range:	500km
Fuel capacity:	1100l
Fording:	1.4m
Vertical obstacle:	0.9m
Trench:	2.8m
Gradient:	60%
Side slope:	40%
Armour:	Classified
Armour type:	Steel
NBC:	Yes
Night vision equipment:	Yes

## DEVELOPMENT

The TM-800 MBT is very similar to the Russian T-54/T-55 and has almost same hull and turret, main external difference that it has six smaller road wheels whereas the T-54/T-55 has five larger

road wheels. The TM-800 also has side skirts which extend the full length of the vehicle and unlike the Russian T-54/T-55/T-62/T-72 there is no exhaust outlet on the left side of the hull. The driver is seated front left with some ammunition to his right with turret in centre and powerpack at the rear. Commander and gunner are on the left with the loader on the right.

Main armament consists of a 100mm gun which is fitted with a fume extractor near the muzzle. Turret traverse is 360 degrees with weapon elevation from -5 to +17 degrees.

Standard equipment includes infra-red night vision equipment for commander, gunner and driver and a computerised fire control system. A dozer blade and mine clearing system can be mounted at front of the hull.

## VARIANTS

TR-85, similar to T-55 but has laser rangefinder above 100 mm mantlet, chassis has six road wheels, different rear engine decks and side skirts

TR-85N, upgraded TR-85

TR-85M1, latest upgrade with many improvements including additional armour over frontal arc of turret

TR-125, was similar to Russian T-72 but only a few were built

TER-800 is ARV model of TR-800

TR-580, this is believed to have preceded the TR-85 and has a similar hull but the six road wheels are spoked, has side skirts fitted

## STATUS

Production complete. In service with Romania.

## MANUFACTURER

Romanian state factories.



## LIGHT TANKS AND MAIN BATTLE TANKS



**Above:**  
**TM-800**

**Top Right:**  
**TR-85M1**  
**upgraded**

**Left:**  
**TM-800**

**Right:**  
**TR-85**



# T-90 MET (Russia)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate fitted with additional armour, turret centre and engine compartment rear. Long range fuel tanks and unditching beam often carried on hull rear. Exhaust outlet on left side of hull above last road wheel station
- Rounded turret with 12.7 mm machine gun mounted on right side of turret roof, smoke grenade launchers mounted either side towards turret rear, either side of 125mm gun is the box type sensor head of the Shtora defensive aids suite
- Suspension either side has six road wheels, idler front, drive sprocket rear with upper part of suspension covered by tracks. Forward part of skirt has additional large square armour panels

## SPECIFICATIONS

Crew:	3
Armament:	1 x 125mm gun/missile launcher, 1 x 7.62mm MG (coaxial), 1 x 12.7mm MG (anti-aircraft), 2 x 6 smoke grenade launchers
Ammunition:	43 x 125mm, 300 x 12.7mm anti-aircraft, 2000 x 7.62 mm (coaxial)
Length gun forwards:	9.53m
Length hull:	6.86m
Width with skirts:	3.78m
Height without 12.7mm MG:	2.26m
Ground clearance:	0.47m
Weight, combat:	46,500kg
Weight, empty:	44,500kg
Power-to-weight ratio:	18.06hp/t
Ground pressure:	0.91 kg/cm
Engine:	Model V-84MS 12-cylinder diesel developing 840 hp
Maximum road speed:	60km/h
Maximum road range:	550km
Fuel capacity:	1200 lit
Fording with preparation:	5m
Fording without preparation:	1.8 m
Vertical obstacle:	0.85m
Trench:	2.8m
Gradient:	60%
Side slope:	40%
Armour:	Classified
Armour type:	Steel/composite/reactive
NBC system:	Yes
Night vision equipment:	Yes (commander, gunner, driver)

## DEVELOPMENT

The T-90 MBT is a further development of the T-72 MBT and entered low rate production in 1994. The vehicle incorporates some sub-systems of the T-80 especially in the areas of the defensive aids systems, fire control and latest generation explosive reactive armour which provides protection against kinetic and chemical energy attack.

The overall layout of the T-90 is similar to that of the T-72 with the driver at the front, two man turret in the centre with the gunner on the left and the commander on the right who also operates the roof mounted 12.7mm AA MG. Like the T-72 and earlier T-54/T-55/T-62 MBTs, the T-90 has an exhaust outlet on the left side of the hull towards the rear. Diesel fuel can be injected into the exhaust outlet to lay a smoke screen.

The 125mm smooth bore gun is mounted in a turret with a traverse of 360 degrees and the weapon can elevate from -6 to +14 degrees. The 125mm gun, which is fed by an automatic loader, can also fire a laser guided projectile in addition to HE-FRAG (FS), HEAT-FS and APFSDS-T ammunition types.

The hull front and turret front and sides are fitted with explosive reactive armour and a Shtora-1 defensive aids suite is normally fitted.

## VARIANTS

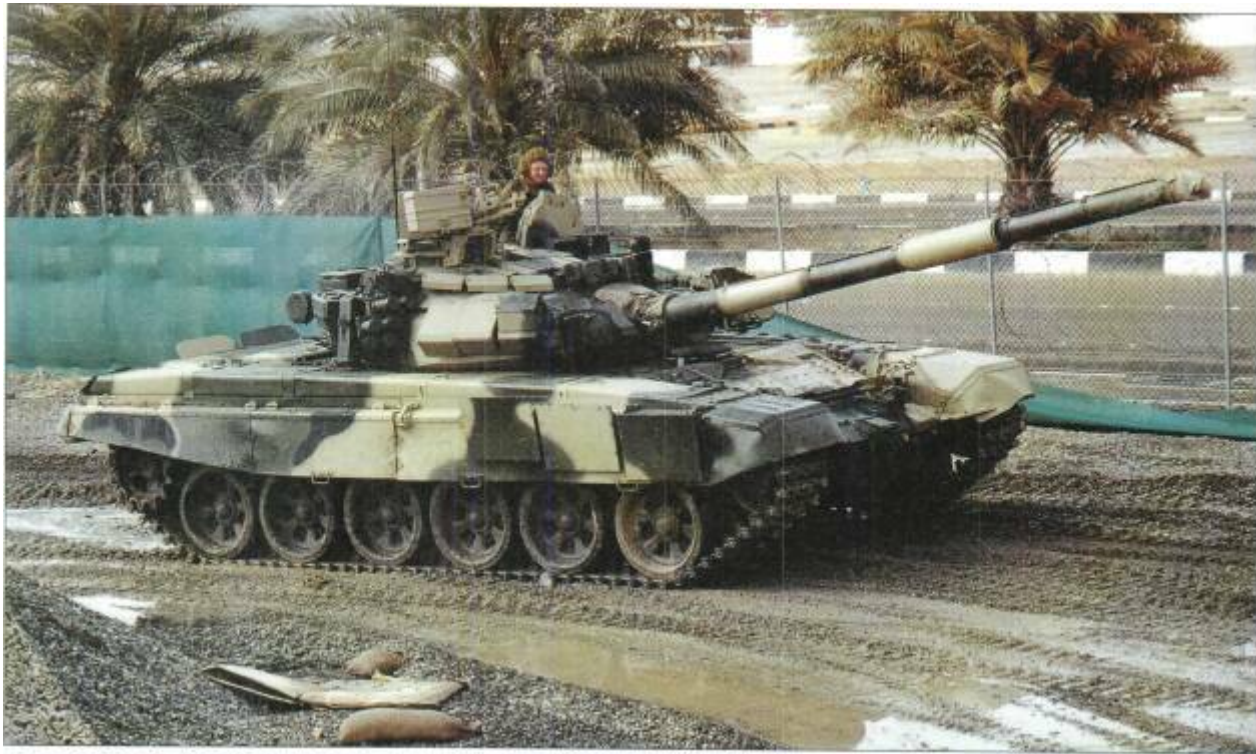
Export models are the T-90E/T-90S.

## STATUS

Production. In service with Russia.

## MANUFACTURER

Nizhnyi Tagil, Russia.



*T-90 MBT (Christopher F Foss)*

# T-80B MET (Russia)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with distinctive V splash board, turret centre and engine compartment rear. Long-range fuel tanks and unditching beam often carried on far rear of hull which also has distinctive rectangular air outlet (not on T-64 series)

- Rounded turret, machine gun ammunition boxes on left, stowage box right, snorkel carried horizontally at rear. Main gun has thermal sleeve and fume extractor, 12.7mm AA MG on roof and smoke grenade dischargers each side of main armament. Infra-red searchlight on right of main armament

- Suspension each side has six road wheels, idler front, drive sprocket rear and track-return rollers covered by skirts. Unlike T-64 and T-72 there is no exhaust outlet left of engine compartment. Road wheels larger than T-64's with gap between 2nd/3rd and 4th/5th

## SPECIFICATIONS

Crew:	3
Armament:	1 x 125mm gun/missile launcher, 1 x 7.62mm MG (coaxial), 1 x 12.7mm MG (anti-aircraft), smoke grenade dischargers (depends on model)
Ammunition:	36 x 125mm, 1,250 x 7.62mm MG (coaxial), 500 x 12.7mm (anti-aircraft) and 5 AT-8 Songster ATGW
Length gun forwards:	9.9m
Length hull:	7.4m
Width:	3.4m
Height to commander's cupola:	2.202m
Ground clearance:	0.38m
Weight, combat:	42,500kg
Power-to-weight ratio:	25.90hp/tonne
Ground pressure:	0.86kg/cm <sup>2</sup>
Engine:	Gas turbine developing 1000hp
Maximum road speed:	70km/hr
Maximum road range:	450km
Fuel capacity:	1100 lit
Fording:	1.8m
Fording with preparation:	5.0m
Vertical obstacle:	1m
Trench:	2.85m
Gradient:	60o/o
Side slope:	40%
Armour:	Classified
Armour type:	Steel/composite/reactive
NBC system:	Yes
Night vision equipment:	Yes (commander, driver and gunner)

## DEVELOPMENT

The T-80 MBT was developed in the late 1970s and is believed to have entered production in 1983 with first production MBTs being completed the following year. The most significant features of the T-80 over the earlier T-72 are its gas turbine engine and the ability to fire the Songster AT-8 ATGW from the 125mm gun.

The overall layout of the T-80 is similar to that of other recent Soviet MTBs with the driver at the front, two man turret in centre with the gunner on the left and commander, who also mans the 12.7mm anti-aircraft machine gun, on the right. The powerpack, which includes a gas turbine engine, is at the rear. With the exception of the T-64, all post Second-World War Russian MBTs had the exhaust outlet on the left side towards the rear. The more T-80 has a distinct oblong outlet in the centre of the hull at the rear.

The T-80 has a 125mm smooth bore gun that is fed by an automatic loader which can fire HE-FRAG (FS), HEAT-FS and APFSDS-T rounds, or an AT-8 Songster ATGW. Turret traverse is a full 360° with weapon elevation from -5° to +14°. The gun is fully stabilised.

## VARIANTS

T-80, original production model, not built in large numbers.

T-80B, first version produced in large numbers.

T-80BK, command version of T-80B with additional communications equipment.

T-80BV, T-80 with explosive reactive armour, combat weight 42.5 tonnes.

T-80BVK, command version of T-80BV with additional communications equipment.

T-80U, first seen in 1989 and sometimes referred to as MI989

## LIGHT TANKS AND MAIN BATTLE TANKS



by NATO, has diesel rather than gas turbine engine, different engine decking, new commander's cupola, four smoke grenade dischargers either side of turret, different vision equipment, and new armour package that includes armoured side skirts.

T-80UD, has gas turbine replaced by 1100hp diesel engine.

T-80UK, command tank version of T-80U.

T-80UM, powered by 1250hp gas turbine, new fire control system.

T-80UM1, also-called Bars (Snow Leopard) has Shtora-1 countermeasures system and more powerful engine

T-80UM2, new cast turret

BREM-80, is armoured recovery vehicle

T-84, further development of T-80 in the Ukraine (qv).

### STATUS

Production. In service with Cyprus, Pakistan, Russia, South Korea and Ukraine.

### MANUFACTURERS

Kirov Works (Leningrad), Khar'kov (Ukraine) and Omsk.

*Above left:  
T-80U MBT*

*Above right:  
T-80U MBT*

# T-64 MBT (Russia)

## KEY RECOGNITION

### FEATURES

- Well sloped glacis plate with driver's position top centre, distinctive V splash plate on glacis, turret centre of hull, engine and transmission rear. Unlike T-72, no exhaust outlet on left side of hull

- Circular turret, raised cupola with external 12.7mm MG on right of roof, two stowage boxes right side of turret and one on turret rear (above which is the snorkel), three MG ammunition boxes on left side of turret. Infra-red searchlight to left of 125mm gun with thermal sleeve and fume extractor.

- Suspension each side has six road wheels (much smaller than those on T-72), idler front, drive sprocket rear and four track-return rollers. Side skirts or gill type armour panels often installed over upper part of suspension. Unditching beam and fuel drums often carried rear

## SPECIFICATIONS (T-64B)

Crew:	3
Armament:	1 x 125mm, 1 x 7.62 MG (coaxial), 1 x 12.7mm MG (AA)
Ammunition:	36 x 125mm, 1250 x 7.62mm, 300 x 12.7mm
Length gun forwards:	9.9m
Length hull:	4.4m
Width without skirts:	3.38m
Width with skirts:	4.64m
Ground clearance:	0.377m
Weight, combat:	39,500kg
Power-to-weight ratio:	17.7hp/ton

### Ground pressure:

Engine: Model 5DTF 5-cylinder opposed  
diesel developing 700hp

Maximum road speed: 75km/hr

Maximum road range: 400km

Maximum road range with

long-range fuel tanks: 550km

Fuel capacity 1,000 lit

Fording: 1.811

Fording with preparation:

Vertical obstacle: 0.8m

**Trench:** 2.28m

Gradient:

Side slope:

Armour: Classified

Armour type: Laminate/steel/reactive

NBC system: Yes

Night vision equipment: Yes (infra-red for commander, gunner and driver)



**Above: T-64A**

## DEVELOPMENT

T-64 entered production in 1966 and was first seen in public in 1970. It has never been exported outside the former USSR and has not appeared in any Russian military parades.

T-64 looks similar to T-72 but has infra-red searchlight on left of 125mm gun, different powerpack, narrower track, different suspension and slightly different turret Layout is similar to T-72 with driver front, turret centre, commander left, gunner right, engine and transmission rear.

Main armament comprises a 125mm smooth bore gun which power-elevates from -6° to 14°, turret traverses 360°. Similar to that installed in the T-72, it has an automatic loader which delivers eight rounds a minute. Three types of ammunition are fired: APFSDS, HEAT-FRAG and HE-FRAG (FS). A 7.62mm MG is mounted coaxial to right of main armament and a 12.7mm MG is mounted on gunner's cupola for use in the anti-aircraft role.



### VARIANTS

T-64, original model, no thermal sleeve for 115mm gun.

T-64A, first production model to be built in quantity, smoke grenade dischargers either side of gun, side skirts.

T-64AK, command vehicle.

T-64B, can fire AT-8 Songster ATGW.

T-64BK, command vehicle.

T-64BM, fitted with 6TD 1.000hp engine

T-64BV, T-64 with explosive reactive armour.

T-64B1,

T-64B1K, command version of T-64B1.

T-64BV1K, T-64B with explosive reactive armour and communications equipment for use in command role.

T-64R, believed to be T-64 with gun of T-72/T-80 firing ATGW.

T-64 can be fitted with mineclearing equipment.

BREM-64, ARV on T-64 chassis.

### STATUS

Production complete. In service only with Russia, Ukraine and Uzbekistan.

### MANUFACTURER

Russian state arsenals.



*Top: T-64A*

*Below: T-64A*

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver's position top centre, distinctive V splash plate on glacis, turret centre of hull, engine and transmission rear, exhaust outlet on left side of hull above last road wheel station
- Circular turret, raised cupola with external 12.7mm MG on right of roof, stowage box rear and right, snorkel left side, infra-red searchlight right of 125mm gun which has thermal sleeve and fume extractor. Unditching beam and long-range fuel tanks sometimes fitted rear
- Suspension each side has six road wheels, drive sprocket rear, idler front and three track-return rollers. Upper part often covered by rubber skirt or fold-out armour panels over forward wheel stations

## SPECIFICATIONS (T-72B1)

Crew:	3
Armament:	1 x 125mm, 1 x 7.62mm MG (coaxial), 1 x 12.7mm MG (AA)
Ammunition:	45 x 125mm, 2,000 x 7.62mm, 300 x 12.7mm
Length gun forwards:	9.24m
Length hull:	6.95m
Width without skirts:	3.6m
Width with skirts:	4.75m
Height without AA MG:	2.37m
Ground clearance:	0.47m
Weight, combat:	44,500kg
Power-to-weight ratio:	18.9hp/tonne
Ground pressure:	0.84kg/cm <sup>2</sup>
Engine:	V-46 V-12 diesel developing 840hp at 2,000rpm
Maximum road speed:	80km/hr
Maximum road range:	480km, 550km (with long-range tanks)
Fuel capacity:	1,000 lit
Fording:	1.8m (without preparation), 5m (with preparation)
Vertical obstacle:	0.85m
Trench:	2.8m
Gradient:	600/0
Side slope:	40%
Armour:	Classified
Armour type:	Composite/steel
NBC system:	Yes
Night vision equipment:	Yes (infra-red for commander, gunner and driver)

## DEVELOPMENT

T-72 entered production in 1971 and was first seen in public in 1977. As well as being produced in the former USSR it has been built under licence in Czechoslovakia, India, Iran, Iraq, Poland and former Yugoslavia.

Layout is conventional, with driver front, turret centre, engine and transmission rear. Commander sits left, gunner right. There is no loader as the 125mm smooth bore gun has an automatic carousel loader with charge above and projectiles below. Types of ammunition include HEAT-FS, HE-FRAG (FS) and APFSDS, a normal mix being 12 APFSDS, 21 HE-FRAG (FS) and six HEAT-FS. A 7.62mm MG is mounted coaxial to right of 125mm gun and a 12.7mm AA MG mounted externally on gunner's hatch.

Composite armour is used in forward part of hull.

A dozer blade is mounted under the nose and additional fuel tanks can be placed at the rear to extend operational range.

## VARIANTS

The Russians have the following designations for the T-72 series of MBT which differ in some areas from those used by NATO: T-72, original production model with coincidence rangefinder.

T-72K, command version of above.

T-72A, a number of improvements including laser rangefinder, in the Warsaw Pact was called T-72M with T-72G being export version.

T-72AK, command version of T-72A.

T-72AV, T-72 with explosive reactive armour.

T-72M, export model of T-72A.

T-72M1, modernised T-72M with additional armour.

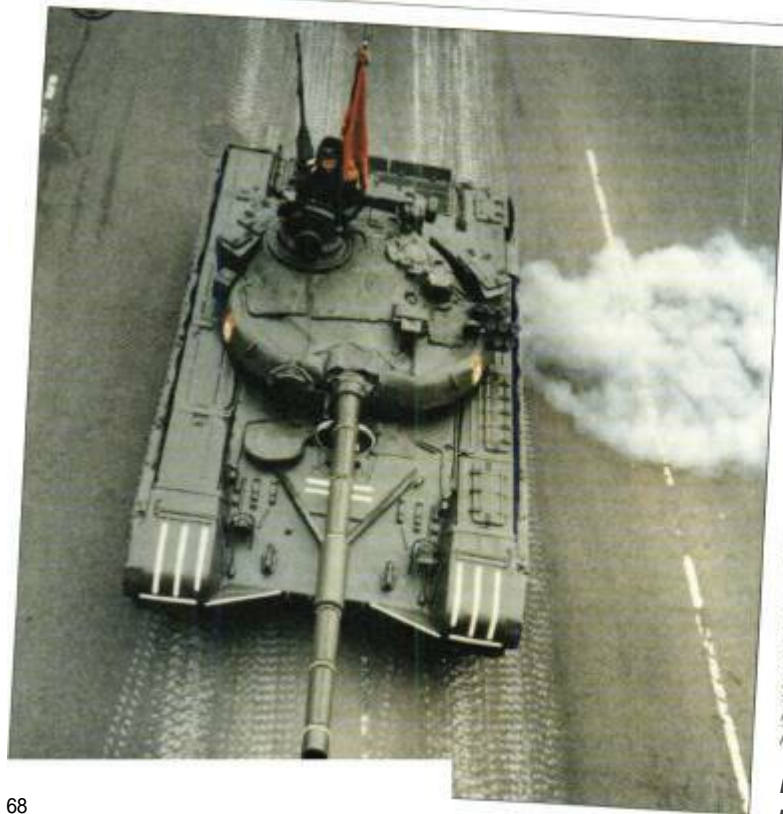
T-72B, thicker turret armour.

*Right: T-72M MBT (Michael Jerchel)*





# T-Z2 MBT (Russia)



## SPECIFICATIONS (T-72B1)

Crew:	3
Armament:	1 x 125mm, 1 x 7.62mm MG (coaxial), 1 x 12.7mm MG (AA)
Ammunition:	45 x 125mm, 2,000 x 7.62mm, 300 x 12.7mm
Length gun forwards:	9.24m
Length hull:	6.95m
Width without skirts:	3.6m
Width with skirts:	4.75m
Height without AA MG:	2.37m
Ground clearance:	0.47m
Weight, combat:	44,500kg
Power-to-weight ratio:	18.9hp/tonne
Ground pressure:	0.84kg/cm <sup>2</sup>
Engine:	V-46 V-12 diesel developing 840hp at 2,000rpm
Maximum road speed:	80km/hr
Maximum road range:	480km, 550km (with long-range tanks)
Fuel capacity:	1,000 lit
Fording:	1.8m (without preparation), 5m (with preparation)
Vertical obstacle:	0.85m
Trench:	2.8m
Gradient:	60%
Side slope:	40%
Armour:	Classified
Armour type:	Composite/steel

Left: T-72BM MBT (Stefax Marx)

Right: T-72B1 MBT

## LIGHT TANKS AND MAIN BATTLE TANKS



# T-62 MET (Russia)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with splash board mid-way, horizontal hull top with driver's hatch front left, turret centre, engine and transmission rear
- Turret is circular and well sloped all round, loader's cupola on right normally mounts 12.7mm AA MG, MG ammunition boxes sometimes stowed right side of turret to rear, snorkel left side of turret rear. Main armament has fume extractor about one-third distance from muzzle, infra-red searchlight right of main armament
- Suspension each side has five road wheels, idler front, drive sprocket rear, no track-return rollers, no skirts. Exhaust port on left track guard above fourth/fifth road wheel, flat fuel/oil storage tanks right side of hull above track

## SPECIFICATIONS

Crew:	4
Armament:	1 x 115mm, 1 x 7.62mm MG (coaxial), 1 x 12.7mm MG (anti-aircraft)
Ammunition:	40 x 115mm, 2,500 x 7.62mm, 300 x 12.7mm
Length gun forwards:	9.335m
Length hull:	6.63m
Width:	3.3m
Height:	2.395m (without AA MG)
Ground clearance:	0.43m
Weight, combat:	40,000kg
Weight, empty:	38,000kg
Power-to-weight ratio:	14.5hp/tonne
Ground pressure:	0.77kg/cm <sup>2</sup>
Engine:	Model V-55-S V-12 water-cooled diesel developing 580hp at 2,000rpm
Maximum road speed:	50km/hr
Maximum road range:	450km
Maximum road range (with auxiliary tanks):	650km
Fuel capacity:	675+285 lit
Vertical obstacle:	0.8m
Trench:	2.85m
Gradient:	60%
Side slope:	30%
Armour:	242mm (maximum)
Armour type:	Steel
NBC system:	Yes
Night vision equipment:	Yes (infra-red for commander, gunner and driver)

## DEVELOPMENT

T-62, a further development of T-54/T-55, entered production in 1961, continuing until 1975. A small number were also built in former Czechoslovakia.

Layout is conventional with driver front left, some ammunition stowed to his right, turret centre and engine and transmission rear. Commander and gunner sit left of turret, loader right. Loader also mans 12.7mm MG.

115mm smooth bore gun power-elevates from -6° to +16° and powered turret traverses through 360°. The gun fires HE-FRAG(FS), HEAT-FS and APFSDS rounds and empty cartridge cases are ejected from a trap door in turret rear. A 7.62mm MG is mounted coaxial to right of main armament and a 12.7mm AA MG is mounted on roof. The gun is fully stabilised in both horizontal and vertical planes.

T-62 lays its own smoke screen by injecting diesel fuel into the exhaust, and additional fuel tanks can be fitted at hull rear to extend its operational range. An unditching beam is usually carried rear.

## VARIANTS

T-62K, K in designation means command.

T-62D, has Drozd anti-tank defensive system, additional armour.

T-62D-1, as above but different engine.

T-62M, can fire laser guided projectile, passive armour and many other improvements.

T-62M-1, similar to above.

T-62M1, passive armour, different engine.

T-62M1-1, upgrade without laser guided projectile capability and passive armour.

T-62M1-2, similar to above.

T-62M 1-2-1, similar to above.

T-62MV, upgrade with capability to fire laser guided projectile, also has explosive reactive armour.

T-62 flamethrower (in service), has flame gun mounted coaxial with 115mm gun.

Egyptian T-62s, some of which have two smoke rockets each side of turret.

### STATUS

Production complete. In service with Afghanistan, Angola, Algeria, Belarus, Cuba, Egypt, Ethiopia (limited numbers), Iran, Iraq, Israel, North Korea, Libya, Mongolia, Russia, Syria, Uzbekistan, Vietnam, Yemen.

### MANUFACTURERS

Former Czechoslovakian, North Korean and Russian state factories.



*Right: Iraqi T-62M MBT*



# MET (Russia)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with splash board mid-way up, horizontal hull top with driver's hatch front left, turret centre, engine compartment rear. Vertical hull rear

- Turret circular and well sloped all round, loader's cupola on right normally mounts 12.7mm AA MG. 100mm gun has no thermal sleeve but bore evacuator to immediate rear of muzzle. Infra-red night searchlight right of main armament

- Suspension each side has five road wheels, idler front, drive sprocket rear, no track-return rollers or skirts, exhaust pipe on left track guard above fourth/fifth road wheel, distinct gap between first and second road wheels. Flat fuel/oil storage tanks right side of hull above track

## SPECIFICATIONS (T-54)

Crew:	4
Armament:	1 x 100mm, 1 x 7.62mm MG (coaxial), 1 x 7.62 mm (bow), 1 x 12.7mm MG (anti-aircraft)
Ammunition:	34 x 100mm, 3,000 x 7.62mm, 500 x 12.7mm
Length gun forwards:	9m
Length hull:	6.04m
Width:	3.27m
Height without AA MG:	2.4m
Ground clearance:	0.425m
Weight, combat:	36,000kg
Weight, empty:	34,000kg
Power-to-weight ratio:	14.44hp/tonne
Ground pressure:	0.81kg/cm <sup>2</sup>
Engine:	V-12 water-cooled diesel developing 520hp at 2,000rpm
Maximum road speed:	50km/hr
Maximum road range:	510km
Maximum road range with long range fuel tanks:	720km
Fuel capacity:	812 lit
Fording:	1.4m
Fording with preparation:	5.0m
Vertical obstacle:	0.8m
Trench:	2.7m
Gradient:	60%
Side slope:	40%
Armour:	203mm (maximum)
Armour type:	Steel
NBC system:	None
Night vision equipment:	Yes (infra-red for commander, gunner and driver)

## DEVELOPMENT

T-54 is a further development of T-44 which itself was a development of T-34. First T-54 prototype was completed in 1946 with first production vehicles following in 1947. Production continued in the former USSR as late as 1981 and was also undertaken in China (Type 59 qy), former Czechoslovakia and Poland. Further development resulted in the T-62 with its 115mm gun (qv).

Layout is conventional, with driver front left, some ammunition stowed to his right, turret centre, engine and transmission rear. Commander and gunner sit on left of turret, loader right. Loader also mans 12.7mm AA MG.

Main armament comprises 100mm rifled gun which power-elevates from -5° to +17°, and turret traverses through 360°.

The gun fires AP, APC-T, HE, HE-FRAG, HEAT-FS, and HVAPDS-T rounds with average rate of fire of four rounds a minute. A 7.62mm MG is mounted coaxial right of main armament and a similar weapon, operated by the driver, is fixed in the glacis plate firing forwards. A 12.7mm AA MG is mounted on the loader's cupola. The T-54 series lays its own smoke screen by injecting diesel fuel into the exhaust outlet on left side of hull. The tank can also be fitted with a dozer blade and various types of mine-clearing system.

## VARIANTS

There are countless variants of the T-54/T-55 and listed below is a resume of those from Soviet sources.

T-54, there are numerous differences between early production T-54 vehicles and later models with some having a wider mantlet and turret undercut at the rear. These are sometimes referred to as the T-54 (1949), T-54 (1951) and T-54 (1953).

T-54A, has fume extractor for 100mm gun, stabilisation system



*Below: Upgraded Slovenian M-55 S1 MBT.*



## T-54/T-55 MET (Russia)



**Above: T-55 AM series MBT with turret traversed to rear**

**Far right: T-55AM2B with additional armour**

and deep fording equipment.

T-54AK, command tank (Polish model is T-54AD).

T-54M, T-54 upgraded to T-55M standard.

T-54B, first model to have infra-red night vision equipment.

T-55M, 580hp engine, no loader's cupola, stabilised gun, increased ammunition stowage fitted.

T-54 command vehicles have designation of T-54K, T-54BK and T-54MK. T-55 command vehicles are T-55K, T-55AK, T-55MK and T-55MVK.

T-55, T-54 with new turret and numerous other improvements, late production models have 12.7mm AA MG.

T-55A, radiation shielding added plus 12.7mm AA MG.

T-55K, command versions, eg T-55K1 and T-55K2.

T-55M, T-55 upgrade can fire AT-10 Stabber laser guided ATGW through 100mm gun, plus many other improvements.

T-55M-1, as above but further improvements including passive armour

T-55MV, as T-55M but with explosive reactive armour.

T-55AM-1, T-55A upgrade to fire AT-10 Stabber plus passive armour, also:

Czechoslovakian built = T-55AM2B

Polish built = T-55AM2P

Russian built = T-55AM2PB

T-55AD, T-55M with Drozd countermeasure system.

T-55AD-1, as above but with different engine.

There are many variations between production tanks, eg Polish-built vehicles often have large stowage boxes on left side of turret. More recently many have laser rangefinder over 100mm gun.

TO-55 is flamethrower version, flamethrower replacing 7.62mm coaxial MG.

T-54 ARVs, many versions.

T-54 AVLBs, many versions.

IMR combat engineer vehicle.

Many countries have carried out extensive modifications, including Egypt (105mm gun and new night vision equipment) and Israeli TI-67 (105mm gun, new fire-control system).

Romania has upgraded many T-54 vehicles with side skirts, six road wheels and improved engine cooling. Many companies are now offering upgrade packages for the T-54/T-55. Slovenia has upgraded its MBTs to the M-55 51 standard with new armour and 105mm gun. Some Iraqi T-54/T-55 MBTs have extra passive armour.

### STATUS

Production complete. In service with Afghanistan, Albania, Algeria, Angola, Azerbaijan, Bangladesh, Belarus, Bosnia-

Herzegovina, Bulgaria,  
Cambodia, Central  
African Republic, Chad,  
China, Congo, Croatia,  
Cuba, Czech Republic,  
Ecuador, Egypt, Eritrea,  
Ethiopia, Finland,  
Georgia, Guinea,  
Hungary, India, Iran,  
Iraq, Israel, Korea  
(North), Laos, Lebanon,  
Libya, Malawi,  
Mauritania, Mongolia,  
Mozambique, Namibia,  
Nicaragua, Nigeria,  
Pakistan, Peru, Poland,  
Romania, Russia,  
Rwanda, Slovakia,  
Slovenia, Somalia, Sri  
Lanka, Sudan, Syria,  
Tanzania, Togo, Uganda,  
Ukraine, Uruguay,  
Uzbekistan, Vietnam,  
Yemen, Yugoslavia, and  
Zambia.

### MANUFACTURERS

Former Czechoslovakia,  
Poland, Russia and  
China as Type 59 (qv).



# PT-76 Light Amphibious Tank (Russia)

## KEY RECOGNITION FEATURES

- Hull has pointed nose with vertical sides, turret mounted well to front of chassis, rear of driver
- Round turret with sloping sides and flat roof with large oval-shaped roof hatch opening forwards
- Suspension has six ribbed road wheels, idler front, drive sprocket rear, no track-return rollers

## SPECIFICATIONS

Crew:	3
Armament:	1 x 76.2mm (main), 1 x 7.62mm MG (coaxial)
Ammunition:	40 x 76.2mm, 1,000x 7.62mm
Length gun forwards:	7.62m
Length hull:	6.91m
Width:	3.17m
Height:	2.255m (late model), 2.195m (early model)
Ground clearance:	0.37m
Weight, combat:	14,600kg
Power-to-weight ratio:	16.4hp/tonne
Ground pressure:	0.50kg/cm <sup>2</sup>
Engine:	Model V-6B 6-cylinder in-line water-cooled diesel developing 240hp at 1,800rpm
Maximum road speed:	44km/hr
Maximum water speed:	8-9km/hr
Road range:	370km
Fuel capacity:	380 lit
Fording:	Amphibious
Vertical obstacle:	1.1m
Trench:	2.8m
Gradient:	70%
Side slope:	35°/°
Armour:	14mm (maximum)
Armour type:	Steel
NBC system:	No
Night vision equipment:	Yes (infra-red for driver)

## DEVELOPMENT

PT-76 was developed shortly after the Second World War with first production vehicles completed in 1950 and production continuing until the late 1960s. In Russian army units PT-76 has been replaced by MBTs or specialised versions of BMP-1/BMP-2.

Many automotive components of PT-76 were subsequently used in the BTR-50P amphibious APC, which has a similar chassis.

Drivers sits front, two-man turret centre, engine and transmission rear. It is fully amphibious, propelled in the water by its tracks. Before entering the water the trim vane is erected at front and bilge pumps switched on. To extend the operational range of PT-76 auxiliary fuel tanks can be installed on rear decking; these contain an additional 180 litres and extend road range to 480km.

Main armament comprises a D-56T with elevation from -4° to +30°, turret traverses through 360°. Ammunition fired includes AP-T, API-T, HE-FRAG, HEAT and HVAP-T. Some PT-76s have been fitted with a roof-mounted 12.7mm DShKM MG.

## VARIANTS

First production vehicles had D-56T gun with a multi-slotted muzzle brake, but most common version has a double baffle muzzle brake and bore evacuator towards muzzle.

PT-76B has D-56TM fully stabilised gun.

China has produced an improved version of PT-76, Type 63 (qv), which has a new turret with 85mm gun.

## STATUS

Production complete. In service with Afghanistan, Benin, Cambodia, Congo, Croatia, Cuba, Guinea, Guinea-Bissau, Indonesia, Iraq, Madagascar, Nicaragua, North Korea, Laos, Russia, Uganda, Vietnam, Yugoslavia and Zambia.



**MANUFACTURER**  
Russian state arsenals.

*Above: PT-76 (Richard Stickland)*

# Hyundai KI MET (South Korea)

## KEY RECOGNITION FEATURES

- Blunt nose with almost horizontal glacis plate, driver's hatch in left side, turret centre, raised engine compartment at rear
- Front of turret slopes slightly to rear, sides slope inwards with turret rear vertical. Stowage basket on either side of turret with bank of smoke grenade dischargers on either side of turret. 7.62mm MG on left side of turret roof with 12.7mm MG on right side
- Suspension either side has six road wheels, idler front, drive sprocket at rear, return rollers with upper part of running gear covered by armoured skirt that extends to rear of vehicle

## SPECIFICATIONS

Crew:	4
Armament:	1 x 105mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 1 x 12.7mm MG (anti-aircraft), 1 x 12.7mm MG (anti-aircraft), 2 x 6 smoke grenade dischargers
Ammunition:	47 x 105mm, 2,000 x 12.7mm, 8,800 x 7.62mm
Length gun forwards:	9.672m
Length hull:	7.477m
Width:	3.594m
Height to turret top:	2.248m
Ground clearance:	0.46m
Weight, combat:	51,000kg
Power-to-weight ratio:	23.5hp/tonne
Ground pressure:	0.87kg/cm <sup>2</sup>
Engine:	MTU 871 Ka-501 diesel developing 1,200hp at 2,600rpm
Maximum road speed:	65km/h
Cruising range:	500km
Fuel capacity:	Not available
Fording without kit:	1.2m
Fording with kit:	2.20m
Vertical obstacle:	1m
Trench:	2.74m
Gradient:	60%
Side slope:	30%
Armour:	Classified
Armour type:	Laminate
NBC system:	Yes
Night vision equipment:	Yes

## DEVELOPMENT

The KI MBT was developed by the now General Dynamic Land Systems Division (who designed and built the M1/M1A1 and M1A2 Abrams series of MBT) to meet the specific operational requirements of the South Korean Army. The first of two prototypes was completed in the United States in 1983 and production commenced by Hyundai Precision ft Ind Co Ltd at Changwon in 1985/1986 and since then it is estimated that 1000 vehicles have been manufactured. Many of the key sub-systems, such as engine, transmission, fire control system and sights were developed overseas.

Layout of the KI MBT is conventional with the driver at front left, turret in centre and powerpack at the rear. The commander and gunner are seated on the right of the turret with the loader on the left. Turret traverse and weapon elevation is powered with manual controls for emergency use. The 105mm rifled tank gun has an elevation of +20° and a depression of -10° with turret traverse being a full 360°. An unusual feature of the KI MBT is its hybrid suspension type which has torsion bars at the centre road wheel stations with hydro-pneumatic units at the front and rear stations, this allows the driver to adjust the suspension to suit the type of terrain being crossed.

The computerised fire control system includes a stabilised sight for the tank commander, digital computer, day/night sights and a laser rangefinder. A fire detection/suppression system is fitted as is a heater.

KIM has been developed to meet requirements of Malaysia. K1A has a number of improvements including 120mm M256 tank gun.





#### **VARIANTS**

AVLB, the bridge and launching system was designed and built by Vickers Defence Systems of the UK in 1990 and integrated on a modified K1 chassis in South Korea. Launches a scissors bridge with a length of 22m when opened out.

ARV, this was developed by MaK and is similar to the Leopard 1 ARV and has a winch, dozer/stabiliser blade and hydraulic crane for changing powerpacks in the field.

#### **STATUS**

In production. In service with South Korean Army.

#### **MANUFACTURER**

Hyundai Precision ft Ind Co Ltd, Changwon, South Korea

*Top left:*  
**K1 MET**

*Top right:*  
**K1 MBT**

*Right:*  
**K1 MBT**



# Bofors Stridsvagn 103 MET (Sweden)

## KEY RECOGNITION FEATURES

- 105mm gun fixed centre of well sloped glacis plate which extends half-way along vehicle, horizontal roof, vertical hull rear, two rectangular stowage boxes rear
- Commander's cupola with external 7.62mm MG on right side of hull top, driver's hatch to his left, dozer blade mounted under nose
- Suspension each side has four road wheels, drive sprocket front, idler rear, two track-return rollers, flotation screen (collapsed around hull top)

## SPECIFICATIONS

Crew:	3
Armament:	1 x 105mm, 2 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 8 smoke grenade dischargers, 2 x Lyran launchers
Length gun forwards:	8.99m
Length hull:	7.04m
Width:	3.63m
Height overall:	2.43m
Weight, combat:	39,700kg
Weight, unloaded:	37,000kg
Power-to-weight ratio:	18.4hp/tonne
Ground pressure:	1.04kg/cm <sup>2</sup>
Engines:	Rolls-Royce K60 multi-fuel developing 240bhp at 3,750rpm, Boeing 553 gas turbine developing 490shp at 38,000rpm (but see text)
Maximum road speed:	50km/hr
Maximum water speed:	6km/hr
Maximum road range:	390km
Fuel capacity:	960 lit
Fording:	1.5m, amphibious with preparation
Vertical obstacle:	0.9m
Trench:	2.3m
Gradient:	60%
Side slope:	40%
Armour:	Classified
Armour type:	Steel
NBC system:	None
Night vision equipment:	None

## DEVELOPMENT

Stridsvagn 103, commonly known as S-tank, was developed in the late 1950s by Bofors to meet requirements of the Swedish Army. First prototypes completed in 1961 and production undertaken from 1966 to 1971, by which time 300 had been built. First models were Stridsvagn 103s. Later models, with the flotation screen and dozer blade, were Stridsvagn 103Bs; all vehicles were eventually brought up to this standard.

Stridsvagn 103 is unique in that the 105mm gun is fixed in the glacis plate and is aimed in traverse by pivoting the vehicle on its tracks, and in elevation by adjusting the hydropneumatic suspension from -10° to +12°, with driver acting as gunner. The 105mm gun has an automatic loader and fires APDS, APFSDS, HE and smoke rounds, empty cartridge cases being automatically ejected from the rear. Two 7.62mm MGs are mounted on left hull front, aligned to 105mm gun. Engine compartment at front of vehicle, driver front left, commander to his right, radio operator rear of driver, magazine rear.

For road use the Rolls-Royce diesel is normally used with the Boeing gas turbine engaged when in combat or moving across country. A flotation screen is carried (collapsed around top of hull) and when erected the vehicle is propelled in the water by its tracks. A dozer blade is mounted under front of vehicle.

In 1986 the Swedish Army took delivery of the modernised vehicles known as Strv 103C, which have many improvements including replacement of Rolls-Royce diesel by a Detroit Diesel 6V-53T developing 290hp at 2,800rpm, modified transmission, laser rangefinder and fuel cans arranged alongside hull sides.

A laser rangefinder has been fitted for improved first round hit probability and Lyran launchers that launch illuminating rockets have been fitted. The S-tank is now being replaced by the Leopard 2 MBT.



### VARIANTS

No variants except for the Strv 103C. The Strv 103C can be fitted with mineclearing rollers at the front of the hull and components of the vehicle are used in the Swedish Bandkanon 1A 155mm self-propelled gun (qv).

### STATUS

Production complete. In service with Swedish Army only.

### MANUFACTURER

Bofors Weapon Systems, Bofors, Sweden

*Right: Bofors  
Weapons  
Systems Strv  
103B*

*Below: Bofors  
Weapons  
Systems Strv  
with additional  
armour*



# Hagglunds Vehicle Ikv-91 Tank Destroyer (Sweden)

## KEY RECOGNITION FEATURES

- Six large road wheels, drive sprocket rear, idler front, wavy side skirt covers upper part of track
- Long thin gun barrel with thermal sleeve and fume extractor
- Turret to rear of well sloped glacis plate

## SPECIFICATIONS

Crew:	4
Armament:	1 x 90mm gun, 1 x 7.62mm coaxial MG, 1 x 7.62mm AA MG, 2 x 6 smoke grenade dischargers, 2 x Lyran launchers
Ammunition:	59 x 90mm, 4,250 x 7.62mm
Length gun forwards:	8.84m
Length hull:	6.41m
Width:	3m
Height:	2.32m (top of commander's cupola)
Ground clearance:	0.37m
Weight, combat:	16,300kg
Power-to-weight ratio:	20.2hp/tonne
Ground pressure:	0.49kg/cm <sup>2</sup>
Engine:	Volvo-Penta TD 120 A, 4-stroke 6-cylinder turbocharged diesel developing 330hp at 2,200rpm
Maximum road speed:	65km/hr
Maximum water speed:	6.5km/hr
Maximum road range:	500km
Fuel capacity:	400 lit
Fording:	Amphibious
Vertical obstacle:	0.8m
Trench:	2.8m
Gradient:	60%
Side slope:	30%
Armour:	Classified but protects against 20mm over frontal arc
Armour type:	Steel
NBC system:	Yes
Night vision equipment:	None

## DEVELOPMENT

The Ikv-91 (Infanterikanonvagn 91) tank destroyer was developed by Hagglund and Söner (today Hagglunds Vehicle) to meet requirements of Swedish Army. First prototypes completed in 1969 with production running from 1975 to 1978.

The 90mm low pressure gun has elevation of +15 degrees and depression of -10, with 360 degree turret traverse. Two Lyran flare launchers mounted on turret roof.

The Ikv-91 is fully amphibious, propelled by its tracks. Before entering the water a trim vane is erected at front of hull, screens erected round air inlets, exhaust and air outlets, and bilge pumps switched on.

Computerised fire-control system has laser rangefinder for increased first-round hit probability. Tracks can be fitted with studs or spikes for deep snow. More recently, vehicles have been modified with Bofors Lyran launchers, thermal sleeve for low pressure gun and additional external stowage.

## VARIANTS

The chassis of the Ikv-91 has been used as a test bed for a twin 120mm mortar system and a 105mm light tank. None of these entered production or service. Optional equipment includes passive night vision equipment, increased armour protection and propellers for increased water speed.

## STATUS

Production complete. In service with Swedish Army only.

## MANUFACTURER

Hagglunds Vehicle AB, Örnsköldsvik, Sweden.



*Above: Ikv-91 with trim vane on glacis plate*

## Pz 68 MET (Switzerland)

### KEY RECOGNITION FEATURES

- Cast hull front with rounded nose and well sloped glacis plate, trim board just above nose, driver's hatch in upper part (hinges to rear), turret centre, engine rear with engine compartment roof sloping slightly to rear. Three stowage boxes above tracks in line with turret
- Rounded cast turret in centre, loader's cupola on left side with externally mounted 7.5mm MG, stowage basket on upper rear of turret (unusual in having no bustle), 105mm gun with fume extractor and thermal sleeve
- Suspension each side has six road wheels, drive sprocket rear, idler front and three track-return rollers

### SPECIFICATIONS

Crew:	4
Armament:	1 x 105mm, 1 x 7.5mm MG (coaxial), 1 x 7.5mm MG (anti-aircraft), 2 x 3 smoke grenade dischargers
Ammunition:	56 x 105mm, 5,200 x 7.5mm
Length:	9.49m
Length hull:	6.88m
Width:	3.14m
Height with AA MG:	2.88m
Height to commander's cupola:	2.75m
Ground clearance:	0.41m
Weight, combat:	19,700 kg
Weight, empty:	38,700 kg
Power-to-weight ratio:	16.62 hp/tonne
Ground pressure:	0.86 kg/cm <sup>2</sup>
Engine:	MTU MB 837 8-cylinder diesel developing 660 hp at 2,200 rpm
Maximum road speed:	55 km/hr
Maximum road range:	350 km
Fuel capacity:	710 lit
Fording:	1.1 m
Vertical obstacle:	0.75 m
Trench:	2.6 m
Gradient:	60%
Side slope:	30%
Armour:	120 mm (maximum)
Armour type:	Steel
NBC system:	Yes
Night vision equipment:	None

### DEVELOPMENT

Further development of the Pz 61 (no longer in service) by the Federal Construction Works at Thun resulted in the Pz 68, with first prototype completed in 1968. Major differences are stabilisation system for the 105mm gun, more powerful engine, modified transmission, wider tracks with replaceable rubber pads and greater length of track in contact with ground.

Between 1971 and 1974, 170 Pz 68s (later designated Pz 68 Mk 1) were delivered to the Swiss Army. In 1977, 50 Pz 68 Mk 2s were delivered; these have thermal sleeve for 105mm gun, system for extracting carbon monoxide, and alternator. A total of 110 Pz 68 Mk 3s were delivered during 1978-79, which have all improvements of the Mk 1 and Mk 2 plus a larger turret. Last production model was the Pz 68 Mk 4, 60 of which were delivered during 1983-84 almost identical to the Mk 3.

Layout is identical to the Pz 61 with driver front, turret centre, commander and gunner right, loader left, engine and transmission rear. 105mm gun fires APDS, APFSDS, HE and smoke projectiles. Turret traverses through 360°, gun power-elevates from -10° to +21°.

In 1988 it was decided to upgrade 195 Pz 68 MBTs to the Pz 68/88 standard. This has a new fire control system, muzzle reference system, stabilised sight for gunner with eyepiece for commander, upgraded suspension and improved NBC system. These upgraded vehicles are known as the Pz 68/88.

### VARIANTS

Entpannungsanzler Pz 65 ARV.

Brückenlegepanzer Pz 68 armoured bridgelay.

Target tank (Pz Zielfz 68) has additional armour protection and new turret with dummy gun.

## LIGHT TANKS AND MAIN BATTLE TANKS



For trials purposes a **Pz 68** MBT has been upgraded with a 120mm Compact Tank Gun.

### **STATUS**

Production complete. In service with Swiss Army

### **MANUFACTURER**

SW Swiss Ordnance Enterprise Corporation, Thun, Switzerland.

**Above: Pz 68 (Swiss Army)**

**Top right: Pz 68 (Swiss Army)**

**Right: Pz Zielfz 68 target tank (Swiss Army)**



# Vickers Defence Systems Challenger 2 MBT (UK)

## KEY RECOGNITION FEATURES

- Front idlers project ahead of nose which slopes back under hull front, well sloped glacis plate with driver's hatch recessed in centre, slightly raised engine compartment at rear. Hull rear slopes inwards at sharp angle
- Turret has well sloped front angled to rear, turret sides and rear vertical, gunner's sight on right side of turret roof, raised periscopic sight in front of commander's cupola, 7.62mm machine gun above loader's position
- Suspension either side has six road wheels, idler front, drive sprocket rear, four track-return rollers. Upper part of suspension covered by skirts

## SPECIFICATIONS

Crew:	
Armament:	1 x 120mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 2 x 5 smoke grenade dischargers
Ammunition:	50 x 120mm, 4,000 x 7.62mm
Length gun forwards:	11.55m 8.327m 3.52m
Height:	2.49m (turret roof)
Ground clearance:	0.50m
<u>Weight, combat:</u>	62,500kg
Power-to-weight ratio:	19.2hp/tonne
<u>Ground pressure:</u>	0.gkg/cm <sup>2</sup>

Engine:	Perkins Engines Condor V-12 12-cylinder diesel developing 1,200bhp at 2,300rpm
Maximum road speed:	56km/h 450km
<u>Fuel capacity:</u>	1592 lit
<u>Fording:</u>	1.07m
Vertical obstacle:	0.9m
Ircncli:	2.34m
Gradient:	
Armour type:	Classified Chobham/steel
NBC system:	Yes
Night vision equipment:	Yes (passive for commander, gunner and driver)



*Right:  
Challenger 2 MBT*





#### DEVELOPMENT

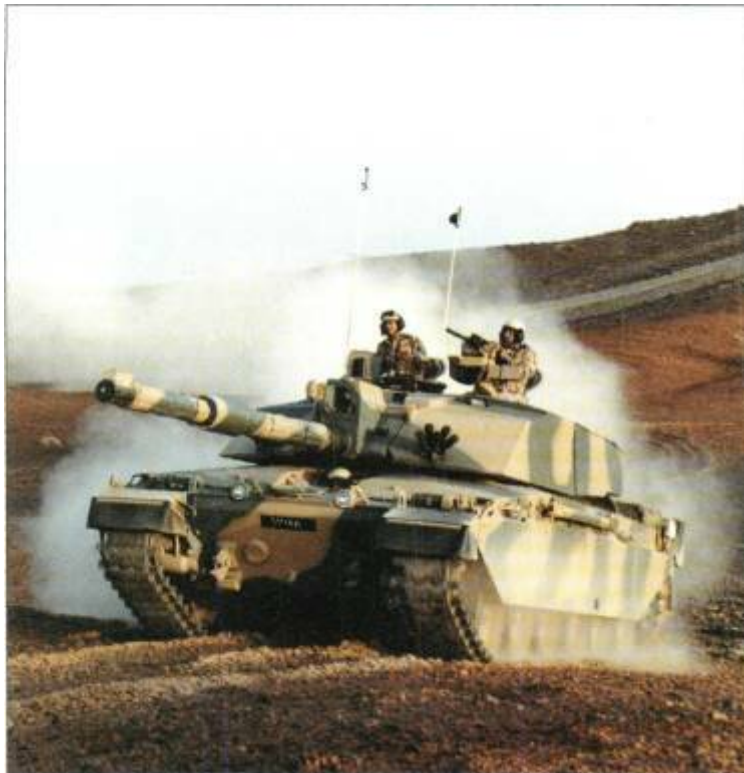
The Challenger 2 was originally developed as a private venture by Vickers Defence Systems and was selected by the British Army in 1991 to meet its requirement for a MBT to replace the Chieftain MBT. First production Challenger 2 MBTs were completed in mid-1994. The British Army has ordered 386 Challenger 2 MBTs while Oman has ordered 38 Challenger 2's.

Although the Challenger 2 has some external resemblance to the earlier Challenger 1 MBT it is essentially a new MBT. The new turret is armed with a Royal Ordnance 120mm L30 rifled tank gun. Turret traverse and gun elevation is all electric and gun is fully stabilised. Turret traverse is a full 360° with weapon elevation from -10° to +20°. A 7.62mm machine gun is mounted coaxial to the left of the main

*Above: Challenger 2 MBT*



# Vickers Defence Systems Challenger 2 MBT (UK)



## SPECIFICATIONS

Crew:

Armament: 1 x 120mm, 1 x 7.62mm MG (coaxial),  
1 x 7.62mm MG (anti-aircraft),  
2 x 5 smoke grenade dischargers

Ammunition: 50 x 120mm, 4,000 x 7.62mm

Length gun forwards: 11.55m

Length hull: 8.327m

Width: 3.52m

Height: 2.49m (turret roof)

Ground clearance: 0.50m

Weight combat: J32,500J<2\_

Power-to-weight ratio: 19.2hp/tonne

Ground pressure:

Engine: Perkins Engines Condor V-12  
12-cylinder diesel developing  
1,200bhp at 2,300rpm\_\_\_\_\_

Maximum road speed: 56km/h

Range: 450km

Fuel capacity: 1592 lit

Fording: 1.07m

Vertical obstacle: 0.9m

Trench: 2.34m

Gradient: 60%

Side slope: 30%

Armour: Classified

***Left: Challenger 2 MBT***

***Right: Challenger 2E MBT***



# Vickers Defence Systems Challenger MBT 1 (UK)

## KEY RECOGNITION FEATURES

- Front idlers project ahead of nose which slopes back under hull, well sloped glacis plate with driver's hatch recessed in centre, turret centre, slightly raised engine compartment rear, hull rear slopes inwards at sharp angle
- Turret has well sloped front angled to rear, turret sides vertical. Commander's cupola on right side with external 7.62mm MG, opening in right side of turret for TOGS
- Suspension each side has six road wheels, idler front, drive sprocket rear, four track-return rollers. Upper part of road wheels and suspension covered by skirts

## SPECIFICATIONS

Crew:	4
Armament:	1 x 120mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 2 x 5 smoke grenade dischargers
Ammunition:	64 x 120mm, 4,000 x 7.62mm
Length gun forwards:	11.56mm
Length hull:	8.327m
Width overall:	3.518m
Height to top of commander's sight:	2.95m
Height to turret top:	2.5m
Ground clearance:	0.5m
Power-to-weight ratio:	19.35bhp/tonne
Weight, combat:	62,000kg
Weight, empty:	60,000 kg
Ground pressure:	0.97kg/cm <sup>2</sup>
Engine:	Perkins Engine Company Condor 12V 1,200 12-cylinder diesel developing 1,200bhp at 2,300rpm
Maximum road speed:	56km/hr
Maximum range:	450km
Fuel capacity:	1,592 lit
Fording:	1.07m
Gradient:	580/0
Side slope:	40%
Armour:	Classified
Armour type:	Chobham/steel
Vertical obstacle:	0.9m
NBC system:	Yes
Trench:	2.8m

Night vision equipment: Yes (passive for commander, gunner and driver)

## DEVELOPMENT

Challenger 1 is a development of the Shir 2 MBT originally built for Iran. First production tanks were delivered by Royal Ordnance Leeds (taken over by Vickers Defence Systems in 1986) in March 1983 and production continued to 1990 by which time 420 had been built. Further development resulted in the Challenger 2 MBT (qv).

Challenger 1 has Chobham armour in its hull and turret, which gives a high degree of protection against both kinetic and chemical energy attack. Driver sits front, turret centre, engine and transmission rear.

Commander and gunner sit right of turret, loader left. 120mm L11A5 rifled gun is identical to Chieftain's and power-elevates from -10° to +20°, with turret traverse 360°. Ammunition includes APDS-T, APFSDS-T, HESH, smoke and training, all rounds of separate loading type. A 7.62mm MG is mounted coaxial to left of main armament, and a second on the commander's cupola. The Improved Fire Control System includes laser rangefinder. Challenger 1s have been fitted with the Barr and Stroud Thermal Observation and Gunnery system. It is expected that the Challenger 1 MBT will be phased out of British Army service by the year 2001, its replacement being the Challenger 2 MBT. part of the Challenger 1 fleet will be transferred to Jordan and some may be converted to specialised roles

## VARIANTS

Challenger 1 can be fitted with front mounted dozer blade or mine clearing systems.

Challenger 1s used in Middle East were fitted with additional

## LIGHT TANKS AND MAIN BATTLE TANKS

armour protection.

Challenger Armoured Repair and Recovery Vehicle.

Challenger Driver Training Tank, Challenger 1 with turret replaced by non-rotating turret.

### STATUS

Production complete. In service with British Army. Jordan is to take delivery of some Challenger 1 MBTs under an agreement signed early in 1999.

### MANUFACTURER

Vickers Defence Systems, Leeds, England.



*Above: Challenger 1*



*Above: Challenger 1 with applique armour*



*Above: Challenger 1*

# Alvis Scorpion Reconnaissance Vehicle (UK)

## KEY RECOGNITION FEATURES

- Rounded nose with well sloped glacis plate, driver's hatch in upper left side and louvres to right, horizontal hull top, vertical hull rear with oblong stowage box

- Turret on hull top to rear with short-barrelled 76mm gun, no muzzle brake or fume extractor, sight to right of 76mm gun. Upper part of turret sides slope inwards to roof, lower turret sides slope inwards towards hull roof. Stowage box each side of turret

- Suspension each side has five large road wheels, drive sprocket front, idler rear, no track-return rollers. Original flotation screen round hull top has been removed from British Army vehicles. Long stowage box above rear road wheels

## SPECIFICATIONS

Crew:	3	Ground pressure:	0.36kg/cm <sup>2</sup>
Armament:	1 x 76mm, 1 x 7.62mm MG (coaxial), 2 x 4 smoke grenade dischargers	Engine:	Jaguar J60 4.2 lit 6-cylinder petrol developing 190hp at 4,750rpm (being replaced with Cummins diesel in British Army service)
Ammunition:	40 x 76mm, 3,000 x 7.62mm	Maximum road speed:	80.5km/hr
Length:	4.794m	Maximum range:	644km
Width:	2.235m	Fuel capacity:	423 lit
Height:	2.102m	Fording:	1.067m, amphibious with preparation
Ground clearance:	0.356m	Vertical obstacle:	0.5m
Weight combat:	8,073kg	Trench:	2.057m
Power-to-weight ratio:	23.54bhp/tonne		



**Right: Alvis Sabre  
(Richard Stickland)**

Gradient: 6000  
 Side slope: 40%  
 Armour: Classified  
 Armour type: Aluminium  
 NBC system: Yr,  
 Night vision equipment: Y< .

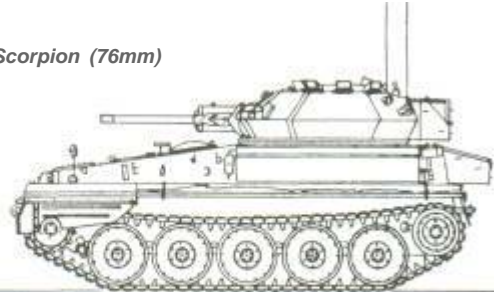
## DEVELOPMENT

Scorpion (FV101), officially named Combat Vehicle Reconnaissance (Tracked), was developed by Alvis to replace Saladin armoured car. First prototype completed in 1969 and first production vehicles in 1972. By 1999 well over 3,500 had been built for home and export. Driver sits front left with engine to right and two-man turret rear. Turret has commander on left and gunner right. Turret traverse is manual through 360° and 76mm gun elevates from -10° to +35°. Main armament fires HESH, HE and smoke rounds with 7.62mm MG mounted coaxial to left. Flotation screen is carried collapsed round top of hull which when erected makes vehicle fully amphibious, propelled by its tracks. Wide range of optional equipment available including various fire-control systems, laser rangefinders, diesel engine, 90mm gun, 7.62mm anti-aircraft MG and air-conditioning system. The standard 76mm Scorpion is no longer used by the British Army.

## VARIANTS

Scorpion 90 has Belgian Cockerill 90mm MK III gun. Striker (FV102) ATGW carrier. Spartan (FV103), ARC member of family (see APCs). Stormer, based on components of CVR(T) (see APCs). Streaker high mobility loader carrier, prototypes. Samson (FV106), ARV member of family.

*Alvis Scorpion (76mm)*



*Below: Alvis Scorpion (90mm)*





# Alvis Scorpion Reconnaissance Vehicle (UK)

*Right: Alvis Sultan  
command post  
(Richard Stickland)*



## SPECIFICATIONS

Crew:	3
Armament:	1 x 76mm, 1 x 7.62mm MG (coaxial), 2 x 4 smoke grenade dischargers
Ammunition:	40 x 76mm, 3,000 x 7.62mm
Length:	4.794m
Width:	2.235m
Height:	2.102m
Ground clearance:	0.356m
Weight combat:	8,073kg
Power-to-weight ratio:	23.54bhp/tonne

Ground pressure:

0.36kg/cm<sup>2</sup>

Engine:

Jaguar  
J60 4.2 lit 6-cylinder petrol

developing 190hp at 4,750rpm  
(being

replaced with Cummins

diesel

in British Army service)

Maximum road speed-  
80.5km/hr



*Left: Alvis Scimitar (Marc  
Firmager)*

*Right: Alvis Samaritan  
ambulance (Richard  
Stickland)*





# Vickers Defence Systems Khalid MBT (UK)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver's circular hatch in upper part, turret centre and raised engine compartment rear. Vertical sides.

- 120mm gun mounted internally. Turret identical to Chieftain's except for external stowage, commander's cupola has tall day/night sight with 7.62mm MG left, no day/night searchlight on left side of turret

- Suspension has six road wheels, drive sprocket rear, idler front and three track-return rollers. Upper part of suspension covered by track guards

## SPECIFICATIONS

Crew:	4
Armament:	1 x 120mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 2 x 6 smoke grenade dischargers
Ammunition:	64 x 120mm, 6,000 x 7.62mm
Length gun forwards:	11.55m
Length hull:	8.39m
Width:	3.518m
Height overall:	2.975m
Ground clearance:	0.508m
Weight <sup>combat</sup> :	58,000kg
Weight, empty:	56,500kg
Power-to-weight ratio:	20.68bhp/tonne
Ground pressure:	0.9kg/cm <sup>2</sup>
Engine:	Perkins Condor 12V 12-cylinder diesel developing 1,200bhp at 2,300 rpm
Maximum road speed:	56km/hr
Maximum range:	400km
	950 lit
Forcing:	1.066m
Vertical obstacle:	0.914m
Trench:	3.149m
Gradient:	60%
Side slope:	40%
Armour:	Classified
Armour type:	Steel
NBC system:	Yes
Night vision equipment:	Yes (passive for commander, gunner and driver)

## DEVELOPMENT

In 1974 Royal Ordnance Leeds was awarded contracts by the Iranian Government for 125 Shir 1s and 1,225 Shir 2s, but in 1979 the order was cancelled by the new government although Shir 1 production was then under way. In 1979, Jordan ordered 274 slightly modified Shir 1s under the name Khalid, which were delivered from 1981. Khalid is essentially a late production Chieftain with major changes to the fire-control system and powerpack; the latter is the same as Challenger 1 MBT used by the British Army.

Driver sits front, turret is centre and engine and transmission rear. The 120mm gun has no depression over hull rear. Commander and gunner sit on turret right, loader on left. The 120mm L11A5 rifled gun is identical to that in Chieftain and Challenger 1, and power-elevates from -10° to +20° with turret traverse through 360°. Types of ammunition include APDS-T, APFSDS-T, HESH, smoke and training, all rounds with separate loading. A 7.62mm MG is mounted coaxial to left of main armament and a second is mounted on the commander's cupola.

Khalid has a Pilkington Condor commander's day/night sight. Barr and Stroud laser rangefinder and a Marconi Improved Fire Control System and all electric gun control and stabilisation system. It is also fitted with the Kidde-Graviner Crew Bay explosion and detection system.

**VARIANTS** No variants.

**STATUS** Production complete. In service with Jordan.

## MANUFACTURER

Royal Ordnance Factory Leeds, England, taken over by Vickers Defence Systems in 1986.



# Chieftain Mk 5 MBT (UK)

## KEY RECOGNITION

### FEATURES

driver's hatch in upper part splash board across lower part of glacis plate, turret centre, raised engine compartment rear. Long stowage boxes each side of engine compartment

- Cast turret has well sloped front, 120mm gun mounted in internal mantlet has thermal sleeve and fume extractor. Commander's cupola right side of turret roof, NBC pack on turret rear, stowage basket each side of turret rear

- Suspension each side has six road wheels, drive sprocket rear, idler front and track-return rollers. Upper part normally covered by skirts

## SPECIFICATIONS

Crew:	4
Armament:	1 x 120mm gun, 1 x 7.62mm MG
	1 x 7.62mm MG (commander's cupola), 1 x 12.7mm RMG (see text), 2 x 6 smoke grenade dischargers
Ammunition:	64 x 120mm, 300 x 12.7mm (see text), 6,000 x 7.62mm
Length gun forwards:	10.795
Length hull:	7.518m
Width hull:	3.504m
Height overall:	2.895m
Weight empty:	53,500kg
Ground clearance:	0.508m
Weight combat:	55,000kg
Power-to-weight ratio:	13.63hp/tonne
Ground pressure:	0.9kg/cm <sup>2</sup>
Engine:	Leyland L60, 2-stroke, compression ignition, 6 cylinder (12 opposed pistons) multi-fuel developing 750bhp at 2,100rpm
Maximum road speed:	48km/hr
Maximum range:	400 to 500km
Fuel capacity:	950 lit
Fording:	1.066m
Vertical obstacle:	0.914m
Trench:	3.149m
Gradient:	60%
Side slope:	40°/o
Armour:	Classified

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|                         |                                        |
|-------------------------|----------------------------------------|
| Armour type:            | Steel                                  |
| NBC system:             | Yes                                    |
| Night vision equipment: | Yes (for commander, gunner and driver) |

## DEVELOPMENT

Developed from late 1950s with first prototypes completed in 1959, first production vehicles completed in early 1970s, production continuing until 1978. Layout conventional with driver front, turret centre and engine and transmission rear. Commander and gunner sit right of turret with loader left. Main armament consists of 120mm L11 series rifled gun mounted in powered turret with 360° traverse. Main armament elevates from -10° to +20°. Ammunition is separate loading type (eg projectile and charge) and ammunition includes APFSDS, APDS, HESH and smoke. 7.62mm MG is mounted coaxial, with similar weapon on commander's cupola. Original version used 12.7mm ranging MG but was replaced on British Army vehicles by a Tank Laser Sight (TLS). Computerised fire-control system and main armament stabilised. The Chieftain MBT was phased out of service with British Army in 1996 but the ARV, ARRV, AVLB and AVRE will remain in service for some time. Chieftain can be

fitted with front-mounted dozer blade and mineclearing systems.

### VARIANTS

Mk 3/3P is Mk 3/3 for Iran.

Mk 5/2K is Mk 5 for Kuwait.

Mk 5/3P is Mk 5 for Iran.

Shir 1 was modified Chieftain for Iran but became Khalid (qv).

Qayis Al Ardh is modified Chieftain for Oman.

Chieftain ARV and ARRV.

Chieftain AVLB.

Chieftain AVRE.

### STATUS

Production complete. In service with Iran, Iraq, Jordan (ARV only), Kuwait and Oman (reserve).

### MANUFACTURERS

Royal Ordnance Leeds (taken over by Vickers in 1986); Vickers Defence Systems, Newcastle-upon-Tyne, England, UK.



*Right: Chieftain  
Mk 5/2K for Kuwait*

# Vickers Defence Systems Mk3 MBT (UK)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate, horizontal hull top with driver's hatch right side to immediate rear of glacis plate, turret centre, slightly raised engine compartment rear, vertical hull rear with projecting track guards
- Turret has cast rounded front and external mantlet for 105mm gun with fume extractor and thermal sleeve, stowage boxes each side to turret rear, stowage basket on turret rear, commander's cupola right side of turret roof with prominent day/night sight in forward part
- Suspension each side has six road wheels, large idler front, drive sprocket rear and three track-return rollers. Upper part of track and suspension normally covered by sheet steel skirts which are ribbed horizontally

## SPECIFICATIONS

|                               |                                                                                                                             |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Crew:                         | 4                                                                                                                           |
| Armament:                     | 1 x 105mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 1 x 12.7mm MG (ranging), 2 x 6 smoke grenade dischargers |
| Ammunition:                   | 50 x 105mm, 700 x 12.7mm, 2,600 x 7.62mm                                                                                    |
| Length gun forwards:          | 9.788mm                                                                                                                     |
| Length hull:                  | 7.561m                                                                                                                      |
| Width:                        | 3.168m                                                                                                                      |
| Height to commander's cupola: | 3.099m                                                                                                                      |
| Height to turret roof:        | 2.476m                                                                                                                      |
| Ground clearance:             | 0.432m                                                                                                                      |
| Weight, combat:               | 39,500kg                                                                                                                    |
| Weight, empty:                | 38,000kg                                                                                                                    |
| Power-to-weight ratio:        | 18.22bhp/tonne                                                                                                              |
| Ground pressure:              | 0.88kg/cm <sup>2</sup>                                                                                                      |
| Engine:                       | Detroit Diesel 12V-71T turbocharged diesel developing 720bhp at 2,500rpm                                                    |
| Maximum road speed:           | 60km/hr                                                                                                                     |
| Maximum road range:           | 490km                                                                                                                       |
| Fuel capacity:                | 1,000 lit                                                                                                                   |
| Fording:                      | 1.1m                                                                                                                        |
| Vertical obstacle:            | 0.83m                                                                                                                       |
| Trench:                       | 3m                                                                                                                          |
| Gradient:                     | 60%                                                                                                                         |
| Side slope:                   | 30%                                                                                                                         |
| Armour:                       | 80mm (maximum) (estimate)                                                                                                   |
| Armour type:                  | Steel                                                                                                                       |

|                         |                    |
|-------------------------|--------------------|
| NBC system:             | Optional           |
| Night vision equipment: | Optional (passive) |

## DEVELOPMENT

In 1950 Vickers Defence Systems designed a new MBT specifically for export which used the standard 105mm 17 rifled tank gun and automotive components of the Chieftain MBT. It was subsequently adopted by the Indian Army with first vehicles, designated Vickers Mk 1 (Vijayanta by India), completed in the UK. Production also began at a new tank plant at Avadi, India. First production vehicles, completed in India in 1965. Production was completed in India in the mid-1980s, by which time about 2,200 had been built. The Vickers Mk 1 differed from the current Mk 3 in having a Leyland L60 engine (as in Chieftain) and a welded turret. Vickers also built 70 Mk 1s for Kuwait, delivered between 1970 and 1972. These are no longer in service.

Vickers Mk 2 was never built and further development of Mk 1 resulted in Mk 3 which has a new engine and new turret with cast front. Kenya ordered 38 Mk 3s and three ARVs in 1977, with a second order for 38 Mk 3s and four ARVs in 1978. In 1981 Nigeria ordered 36 Mk 3s, five ARVs and six AVLBs, with a repeat order in 1985. Final deliveries were made late in 1986. In 1990 Vickers Defence Systems received another order from Nigeria with first vehicles being completed late in 1991.

Layout of the Mk 3 is conventional, with driver front right, turret centre, commander and gunner right, loader left, engine and transmission rear. 105mm gun power-elevates from -10° to +20°, turret traverses 360°. Gun fires full range of NATO ammunition including APFSDS, APDS, HESH and smoke. A 7.62mm MG is mounted coaxial with main armament and a 12.7mm ranging MG is installed. Commander's cupola has



## LIGHT TANKS AND MAIN BATTLE TANKS

7.62mm MG which can be aimed from inside the vehicle.

A wide range of optional equipment is available for the Mk 3, including computerised fire-control system, day/night observation equipment, laser rangefinder, NBC system, deep wading or flotation system, air-conditioning system, automatic fire detection and suppression system, air conditioning system, dozer blade and explosive reactive armour.

### VARIANTS

Vickers armoured bridgelayers.

Vickers armoured recovery vehicle.

Vickers anti-aircraft tank: Mk 3 chassis fitted with Marconi Marksman twin 35mm turret; trials only.

Mk 3 (M) was developed for Malaysia and has many improvements including new gun control equipment, laser detectors, new night vision systems and explosive reactive armour.



Above: Vickers Mk 3



### STATUS

Production of Mk 1 completed. Production of Mk 3 as required. In service with India (Mk 1), Kenya (Mk 3), and Nigeria (Mk 3). Tanzania has a small number of Vickers ARVs.

### MANUFACTURERS

Vickers Defence Systems, Imewcastle-upon-Tyne, England (Mk 1 and Mk 3); Avadi Company, Madras, India (Mk 1).



Above: Vickers Mk 3



# Centurion Mk 13 MBT (UK)

## KEY RECOGNITION FEATURES

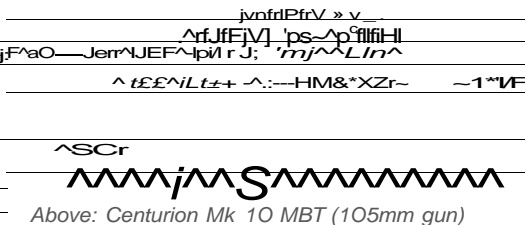
- Well sloped glacis leads up to horizontal hull top with driver's hatch in roof to immediate rear of glacis plate on right side, turret centre and raised engine compartment rear. Hull rear slopes slightly inwards. Flat stowage boxes above hull sides with exhaust pipes each side at rear

- 105mm gun has non-concentric fume extractor and is often fitted with thermal sleeve, rectangular external mantlet which is often uncovered. Commander's cupola on right side, large stowage boxes each side of turret and large stowage rack on rear. Circular ammunition resupply hatch lower left side of turret.

- Suspension each side has six road wheels, idler front, drive sprocket rear and return rollers. Upper part of suspension usually covered by skirts

## SPECIFICATIONS

|                          |                                                                                                                     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------|
| Crew:                    | 4                                                                                                                   |
| Armament:                | 1 x 105mm, 1 x 12.7mm RMG, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (command cupola), 2 x 6 smoke grenade dischargers |
| Ammunition:              | 64 x 105mm, 600 x 12.7mm, 4,750 x 7.62mm                                                                            |
| Length gun forwards:     | 9.854m                                                                                                              |
| Length hull:             | 7.823m                                                                                                              |
| Width:                   | 3.39m                                                                                                               |
| Height without AA MG:    | 3.009m                                                                                                              |
| Ground clearance:        | 0.51m                                                                                                               |
| Weight combat:           | 51,820kg                                                                                                            |
| Power-to-weight ratio:   | 12.54hp/tonne                                                                                                       |
| Ground pressure:         | 0.95kg/cm <sup>2</sup>                                                                                              |
| Engine:                  | Rolls-Royce Mk IVB 12-cylinder liquid-cooled petrol developing 650bhp at 2,550rpm                                   |
| Maximum road speed:      | 34.6km/hr                                                                                                           |
| Maximum road range:      | 190km                                                                                                               |
| Fuel capacity:           | 1037 lit                                                                                                            |
| Fording:                 | 1.45m                                                                                                               |
| Fording with preparation | 2.74m                                                                                                               |
| Vertical obstacle:       | 0.914m                                                                                                              |
| Trench:                  | 3.352m                                                                                                              |
| Gradient:                | 60°/o                                                                                                               |
| Side slope:              | 40°                                                                                                                 |
| Armour:                  | 152mm (maximum)                                                                                                     |
| Armour type:             | Steel                                                                                                               |
| NBC system:              | None                                                                                                                |
| Night vision equipment:  | Yes (but not always fitted today)                                                                                   |



## DEVELOPMENT

Centurion was developed towards the end of the Second World War with 4,423 vehicles produced between 1945/46 and 1961/62. First vehicles armed with a 17 Pounder but this was replaced by a 20 Pounder and finally the famous 105mm L7 series gun which has since been adopted by many other countries. Layout of all versions is similar, with driver front right, turret centre, engine and transmission rear. Commander and gunner sit right of turret, loader left. Main armament is stabilised and power-elevates from -10° to 20° with turret traverse 360°. 105mm ammunition includes APFSDS, APDS, HESH and smoke. Main armament on later models is aimed using 12.7mm RMG, 7.62mm MG mounted coaxial with main armament and similar weapon mounted on commander's cupola. To extend operational range a mono-wheel fuel trailer could be towed behind. Can also be fitted with front-mounted dozer blade.

## VARIANTS

There were 13 basic versions of Centurion gun tank plus many sub-variants but most countries now use only 105mm armed versions.



*Olifant Mk 1B MBT (Christopher F Foss)*

# Centurion Mk 13 MBT (UK)

Israeli Centurions have all been rebuilt with 105mm gun and diesel engine, many fitted with explosive reactive armour. Can also have dozer blade and mine-clearing devices. Israel has Centurions with turret removed for use in ARC role.

Jordan Centurions have 105mm gun, computerised fire-control system, new diesel powerpack and new hydropneumatic suspension. These are called the Tariq.

South African Centurions are known as the Olifant (Elephant). Mk1A has many improvements including new powerpack and 105mm gun. Mk1B has upgraded powerpack, new suspension, 105mm gun and new hull and turret armour.

Swedish Centurions have 105mm gun and were upgraded with

many improvements including new powerpack.

Centurion ARV

Centurion BARV

## STATUS

Production complete. In service with Austria (turrets only in static role), Israel, Jordan (Tariq), Singapore (based in Taiwan for training), South Africa and Sweden.

## MANUFACTURERS

Leyland Motors, Leyland; Royal Ordnance Factory Leeds; Vickers, Elswick; Royal Ordnance Factory Woolwich, England, UK.



*Right Olifant Mk 1A*

*Left: one of the heavy APC on the Centurion chassis is called the Nakpadon (IDF)*



# T-84 MET (Ukraine)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate fitted with blocks of additional armour, turret centre and engine compartment rear. Long range fuel tanks and unditching beam often carried on rear. Upper part of hull has large rectangular exhaust outlet.

- Rounded turret with 12.7mm machine gun mounted on right side of turret roof, smoke grenade launchers mounted either side towards turret rear, flaps extend down either side of turret front and on either side of 125 mm gun is the box type sensor head of the Shtora defensive aids suite

- Suspension either side has six road wheels, idler front, drive sprocket rear with upper part of suspension covered by tracks. Forward part of skirt has additional armour and a skirt normally hangs down at the front of the hull.

## SPECIFICATIONS

|                                     |                                                                                                                                |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Crew:                               | 3                                                                                                                              |
| Armament:                           | 1 x 125mm gun/missile launcher,<br>1 x 7.62mm MG (coaxial),<br>1 x 12.7mm MG (anti-aircraft),<br>2 x 6 smoke grenade launchers |
| Ammunition:                         | 43 x 125mm, 450 x 12.7mm anti-aircraft, 1250 x 7.62 mm (coaxial)                                                               |
| Length gun forwards:                | 9.72m                                                                                                                          |
| Length hull:                        | 7.085m                                                                                                                         |
| Width with skirts:                  | 3.775m                                                                                                                         |
| Height with 12.7 mm MG:             | 2.76m                                                                                                                          |
| Ground clearance:                   | 0.515m                                                                                                                         |
| Weight, combat:                     | 46,000 kg                                                                                                                      |
| Weight, empty:                      | 43,500 kg                                                                                                                      |
| Power-to-weight ratio:              | 26.1J8_het                                                                                                                     |
| Ground pressure:                    | 0.93 kg/cm <sup>2</sup>                                                                                                        |
| Engine:                             | Model 6TD-2 6-cylinder diesel developing 1200 hp                                                                               |
| Maximum road speed:                 | 65 km/h                                                                                                                        |
| Maximum road range:                 | 540km                                                                                                                          |
| Fuel capacity:                      | 1300 lit                                                                                                                       |
| Fording with preparation:           | 5m                                                                                                                             |
| <u>Fording without preparation:</u> | 1.8m                                                                                                                           |
| Vertical obstacle:                  | 1m                                                                                                                             |
| Trench:                             | 2.85m                                                                                                                          |
| Gradient:                           | 63%                                                                                                                            |
| Side slope:                         | 36%                                                                                                                            |
| Armour:                             | Classified                                                                                                                     |
| Armour type:                        | Steel/composite/reactive                                                                                                       |
| NBC system:                         | Yes                                                                                                                            |
| Night vision equipment:             | Yes                                                                                                                            |

## DEVELOPMENT

The T-84 MBT was developed by the Kharkov Morozov Design Bureau with production being undertaken by the Malyshev Plant. The T-84 was developed from the T-80UD which has been manufactured at the Malyshev Plant for the home and export markets. Pakistan has ordered 320 T-80UD MBTs from the Ukraine and it is understood that late production models incorporate some components of the T-84.

The overall layout of the T-84 is similar to that of the T-80 and T-90 with the driver at the front, two man turret in the centre with the gunner on the left and the commander on the right who also operates the roof mounted 12.7 mm AA MG. Unlike the Russian T-72 and T-90, the T-84 does not have an exhaust outlet on the left side of the hull towards the rear.

The 125 mm smooth bore gun is mounted in a turret with a traverse of 360 degrees and the weapon can elevate from -5 to +13 degrees. The 125 mm gun, which is fed by an automatic loader, can also fire a laser guided projectile in addition to HE-FRAG (FS), HEAT-FS and APFSDS-T ammunition types.

The hull front and turret front and sides are fitted with explosive reactive armour and a Shtora-1 defensive aids suite is normally fitted.

## VARIANTS

BREM-84 is an armoured recovery vehicle based on T-84 chassis.

## STATUS

Production. In service with Pakistan and Ukraine.

## MANUFACTURER

Malyshev Plant, Kiev, Ukraine.

## LIGHT TANKS AND MAIN BATTLE TANKS



*Above: T1/T-84 MBT  
(Christopher F Foss)*

*Above right: T2/T-84 MBT  
(Christopher F Foss)*

*Right: T3/T-84 MBT  
(Christopher F Foss)*





# General Dynamics, **Land Systems,** **M1/M1A1/M1A2 Abrams MET (USA)**

## KEY RECOGNITION

### FEATURES

- Nose slopes back under hull, almost horizontal glacis plate, driver's hatch centre under gun mantlet, turret centre, raised engine compartment rear. Hull rear vertical with air louvres in upper part
- Large turret with almost vertical front that slopes to rear, hull sides slope inwards with bustle extending well to rear, stowage box and basket on each side of turret towards rear. Rectangular gunner's sight on right side of turret roof forward of commander's cupola, which has 12.7mm MG mounted. 105mm gun has fume extractor and muzzle reference system
- Suspension each side has seven road wheels, drive sprocket rear, large idler front, two return rollers. Upper part of suspension, idler and most of drive sprocket covered by armoured skirts

## SPECIFICATIONS (M1)

|                            |                                                                                                             |
|----------------------------|-------------------------------------------------------------------------------------------------------------|
| Crew:                      | 4                                                                                                           |
| Armament:                  | 1 x 105mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (AA), 1 x 12.7mm MG (AA), 2 x 6 smoke grenade dischargers |
| Ammunition:                | 55 x 105mm, 1,000 x 12.7mm, 11,400x 7.62mm                                                                  |
| Length gun forwards:       | 9.766m                                                                                                      |
| Length hull:               | 7.918m                                                                                                      |
| Width:                     | <b>3.653m</b>                                                                                               |
| Height to turret roof:     | 2.375m                                                                                                      |
| <u>Height overall:</u>     |                                                                                                             |
| Ground clearance:          | 0.482m                                                                                                      |
|                            | 54,545kg                                                                                                    |
| Power-to-weight ratio:     | 27hp/tonne                                                                                                  |
| Engine:                    | Textron Lycoming AGT1500 gas turbine, 1,500hp at 30,000rpm                                                  |
| <u>Maximum road speed:</u> | <u>72.421km/hr</u>                                                                                          |
| Maximum range:             | <u>498km</u>                                                                                                |
| <u>Fuel capacity:</u>      | <u>1,907 lit</u>                                                                                            |
| <u>Fording:</u>            | 1.219m, 1.98m (with preparation)                                                                            |
| Vehicle obstacle:          | 1.244m                                                                                                      |
| <u>Trench:</u>             | <u>2.743m</u>                                                                                               |
| <u>Gradient:</u>           | <u>60%</u>                                                                                                  |
| <u>Side slope:</u>         | <u>40%</u>                                                                                                  |
| <u>Armour:</u>             | <u>Classified</u>                                                                                           |
| <u>Armour type:</u>        | <u>Laminate/steel</u>                                                                                       |
| <u>NBC system:</u>         | <u>Yes</u>                                                                                                  |
| Night vision equipment:    | Yes (passive for commander, gunner and driver)                                                              |



**Above: M1 (US Army)**



## DEVELOPMENT

After trials of XM1 prototypes built by Chrysler (now General Dynamics Land Systems) and General Motors, the tank was further developed and eventually accepted for service as M1 Abrams MBT. The first production M1 was completed in 1980 and production was undertaken at the Lima Army Tank Plant, Ohio and at the Detroit Arsenal Tank Plant, Sarren, Michigan, but production is now concentrated at Lima. The M1 was followed in production by the improved M1 and then the M1A1 with 120mm gun and numerous other improvements. Final production model was the M1A2 which has been built for Kuwait, Saudi Arabia and United States. Some M1s are being upgraded to M1A2 for US Army.

Layout is conventional with driver front, turret centre and engine and transmission rear. Commander and gunner sit on right of turret, loader on left. Commander mans a roof-mounted 12.7mm MG, loader mans a 7.62mm roof-mounted MG.

Main armament comprises 105mm M68 rifled gun with powered elevation from -9° to +20° and turret traverse through 360°. A 7.62mm MG is mounted coaxial to right of main armament which is stabilised in elevation and traverse. The 105mm gun fires standard ammunition as well as APFSDS-T rounds.

## VARIANTS

M1, basic vehicle with 105mm gun, built 1980-85. Improved M1, M1 with additional armour and built 1984/1986. M1A1 many improvements, including 120mm smooth bore gun, late production vehicles include heavy armour package. M1A2, has 120mm gun, new armour, Commanders



*Right: M1*

*Below: M1A1*



# General Dynamics, Land Systems, M1/M1A1/M1A2 Abrams MET (USA)

M1A2, has 120mm gun, new armour, Commanders Independent Thermal Viewer (CITV) and land navigation system.  
M1 Heavy Assault Bridge (HAB) is based on modified M1 chassis and is in service with US Army.  
Combat Mobility Vehicle - under development by United

Defense IP and based on modified M1 chassis.  
Abrams Recovery Vehicle, developed as a private venture, only single prototype built.  
M1/M1A1/M1A2 can be fitted with dozer or mine clearing systems at front of hull.



**STATUS**

M1, production completed. In service with US Army.

M1A1, production complete, in service with Egypt, US Army And Marines.

M1A2, production completed 1996, in service with Kuwait, Saudi Arabia and US Army many now being upgraded to M1A2 standard).

**MANUFACTURER**

General Dynamics Ltd, Land Systems, Lima Army Tank Plant, Lima, Ohio, also assembled in Egypt.

*Left: M1A2*

*Right: M1A2*



# General Dynamics Land Systems M60A3 MBT (USA)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver centre, turret centre of hull with slightly raised engine compartment rear, which is almost identical to M48 series
- Main armament has non-concentric fume extractor, usually thermal sleeve, and mounted in large external mantlet with rounded corners. Well sloped turret sides with wire basket on rear of bustle. Commander's cupola right side of roof
- Suspension each side has six road wheels, idler front, drive sprocket rear and three track-return rollers

## SPECIFICATIONS

|                           |                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------|
| Crew:                     | 4                                                                                                        |
| Armament:                 | 1 x 105mm, 1 x 7.62mm MG (coaxial),<br>1 x 12.7mm MG (anti-aircraft),<br>2 x 6 smoke grenade dischargers |
| Ammunition:               | 63 x 105mm, 900 x 12.7mm,<br>5,950 x 7.62mm                                                              |
| Length gun forwards:      | 9.436m                                                                                                   |
| Length hull:              | 6.946m                                                                                                   |
| Width:                    | 3.631m                                                                                                   |
| Height:                   | 3.27m                                                                                                    |
| Ground clearance:         | 0.45m                                                                                                    |
| Weight combat:            | 52,617k2                                                                                                 |
| Weight empty:             | 48,684kg                                                                                                 |
| Power-to-weight ratio:    | J4^24j)hj)/tonne                                                                                         |
| Ground pressure:          | Jl87kg7cm^                                                                                               |
| Engine:                   | General Dynamics Land Systems AVDS-1790-2C 12-cylinder air-cooled diesel developing 750bhp at 2,400rpm   |
| Maximum road speed:       | 48.28km/hr                                                                                               |
| Maximum road range:       | 480km                                                                                                    |
| Fuel capacity:            | 1,420 lit                                                                                                |
| Fording:                  | 1.22m                                                                                                    |
| Fording with preparation: | 2.4m                                                                                                     |
| Vertical obstacle:        | 0.914m                                                                                                   |
| Trench:                   | 2.59m                                                                                                    |
| Gradient:                 | 60%                                                                                                      |
| Side slope:               | 30%                                                                                                      |
| Armour:                   | 120mm (maximum) (estimate)                                                                               |
| Armour type:              | Steel                                                                                                    |
| NBC system:               | Yes                                                                                                      |
| Night vision equipment:   | Yes (passive)                                                                                            |

## DEVELOPMENT

M60 MBT series is a further development of M48 series with first prototypes completed in 1958 and first production vehicles completed by Chrysler Corporation, Delaware Defense Plant. From 1960 production was at the Detroit Tank Plant, also operated by Chrysler (later taken over by General Dynamics), and by the time production was completed in 1987 over 15,000 vehicles had been built for home and export markets.

Layout is conventional with driver front, turret centre and engine and transmission rear. Turret has slightly pointed front with commander and gunner on right and loader left. 105mm gun is stabilised and elevates from -10° to +20° with turret traverse through 360°. Main armament has 105mm gun which fires APFSDS, APDS, HESH, HEAT and smoke projectiles, 7.62mm MG mounted coaxial to left and 12.7mm AA MG in commander's cupola. M60A3 has computerised fire-control system, laser rangefinder and thermal night vision equipment. Roller-type mine-clearing devices or dozer blade can be fitted at front of hull.

## VARIANTS

M60, first production model, turret similar to M48 series, originally with searchlight over main armament. M60A1, replaced M60 in production from 1962, has new turret. An explosive reactive armour package was developed for US Army M60 series MBTs but was not fielded. It was however installed on M60A1 MBTs of the US Marine Corps for operations in the Middle east in 1991.

M60A2, withdrawn from service.

M60A3, final production model for US Army. Many M60A1s were brought up to M60A3 standard with thermal night vision equipment.



*Above: M60A3*



# General Dynamics Land Systems M60A3 MBT (USA)



*Above: M60A3*



## LIGHT TANKS AND MAIN BATTLE TANKS

M728, combat engineer vehicle.

M60 AVLB.

In Israel, most M60s fitted with Blazer reactive armour, new commander's cupola with external 7.62mm MG, 7.62mm MG for loader, 12.7mm MG over 105mm gun and smoke grenade dischargers each side of main armament. More recently Israel has developed a further upgraded version of the M60 series called the MAGACH-7 which has many further improvements including a new passive armour package, Matador computerised fire control system and 908hp diesel engine.

### STATUS

Production complete. In service with Austria, Bahrain, Bosnia, Brazil, Egypt, Greece, Iran, Israel, Jordan, Morocco, Oman, Portugal, Saudi Arabia, Spain, Sudan, Taiwan, Thailand, Tunisia, Turkey and Yemen. They are no longer used by the US although large quantities are still held in reserve, many are now being passed to other countries.

### MANUFACTURER

General Dynamics Land Systems,  
Detroit, Michigan, USA.



*Above: Israeli M60A 1 with reactive armour*

# M48A5 MET (USA)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver centre, turret centre of hull, slightly raised engine compartment at rear which is almost identical to M60 MET series
- Main armament has non-concentric fume extractor, no thermal sleeve, mounted in large external mantlet with rounded corners. Large infra-red/white light searchlight often mounted above mantlet. Turret has curved sides and bustle has stowage basket running around rear. Raised commander's cupola on right with external 7.62mm MG with similar weapon for loader on left
- Suspension each side has six road wheels, drive sprocket rear, idler front and five return rollers. US vehicles did not have skirt, South Korean vehicles have

## SPECIFICATIONS

|                           |                                                                                                                            |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Crew:                     | 4                                                                                                                          |
| Armament:                 | 1 x 105mm gun, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (commander), 1 x 7.62mm MG (loader), 2 x 6 smoke grenade dischargers |
| Ammunition:               | 54 x 105mm, 10,000 x 7.62mm                                                                                                |
| Length gun forwards:      | 9.306m                                                                                                                     |
| Length hull:              | 6.419m                                                                                                                     |
| Width:                    | 3.63m                                                                                                                      |
| Height overall:           | 3.086m                                                                                                                     |
| Power-to-weight ratio:    | 15.89hp/tonne                                                                                                              |
| Ground pressure:          | 0.88kg/cm <sup>2</sup>                                                                                                     |
| Ground clearance:         | 0.419m                                                                                                                     |
| Weight combat:            | 48,987kg                                                                                                                   |
| Weight empty:             | 46,287kg                                                                                                                   |
| Engine:                   | General Dynamics Land Systems AVDS-1790-2D diesel developing 750hp at 2,400rpm                                             |
| Maximum road speed:       | 48.2km/hr                                                                                                                  |
| Maximum road range:       | 499km                                                                                                                      |
| Fuel capacity:            | 1,420 lit                                                                                                                  |
| Fording:                  | 1.219m                                                                                                                     |
| Fording with preparation: | 2.438m                                                                                                                     |
| Vertical obstacle:        | 0.915m                                                                                                                     |
| Trench:                   | 2.59m                                                                                                                      |
| Gradient:                 | 60%                                                                                                                        |
| Side slope:               | 40%                                                                                                                        |
| Armour:                   | 120mm (maximum)                                                                                                            |
| Armour type:              | Steel                                                                                                                      |
| hJBCjystem^               | None                                                                                                                       |
| Night vision equipment:   | Yes                                                                                                                        |

## DEVELOPMENT

M48 was developed from 1950 with first prototypes completed in 1951 and first production vehicles in 1952. By the time production was completed in 1959, 11,703 vehicles were built. M48 series replaced M47 in US Army and in the mid-1970s many were upgraded to M48A5 standard with 105mm gun and other improvements. Further development of M48 resulted in M60 (qv) series of MBTs. The M48A5 is no longer in front line US Army service. Driver sits front centre, commander and gunner on right side of turret and loader left. 105mm gun is mounted in turret with powered traverse through 360° and powered elevation from -9° to +19°. M48s can also be fitted with dozer blade.

## VARIANTS

M48, original model, 90mm gun, petrol engine, commander has external 12.7mm MG, five track-return rollers.  
M48C, mild steel hull and turret, training only.  
M48A1, 90mm gun, petrol engine, commander has cupola with internally mounted 12.7mm MG.  
M48A2/M48A2C, 90mm gun, fuel injection system for petrol engine, five track-return rollers.  
M48A3, rebuild of early vehicle with petrol engine replaced by diesel, 90mm gun, vision blocks between commander's cupola and roof, three track-return rollers.  
M48A4 was cancelled project.  
M48A5. Over 2,000 earlier M48s, rebuilt to M48A5 standard from mid-1970s, have many improvements including 105mm gun, new commander's cupola and diesel engine.  
M48A2GA2 is German rebuilt M48A2 with 105mm gun with thermal sleeve. German smoke grenade dischargers, new



*Right: M48A5 of  
Greek Army  
with MOLF fire  
control system  
with 105mm gun*

## M48A5 MET (USA)

mantlet, passive night vision equipment, retained petrol engine. Israeli M48s. All have 105mm gun, diesel engine, low profile commander's cupola. Many have explosive reactive armour like Israeli M60 tanks (qv).

South Korean M48s. Many brought up to M48A5 standard but also have side skirts.

Spain has upgraded many M48s with 105mm gun and many other improvements with M48A5E2 remaining in service.

Taiwan also has model called M48H which is M60A1 chassis

and M48A5 type turret with computerised fire control system and laser rangefinder.

Turkish M48s. 170 upgraded to German M48A2GA2 standard but also have MTU diesel engine. Much larger number upgraded with US assistance to M48A5 standard (known as M45A5T1 in Turkish Army).

M48 AVLB has scissors bridge.

M48 mine-clearing tank with flails is for German Army.

M67/M67A/M67A2, flamethrower tanks, no longer in service.

*Below: M48A2*



### STATUS

Production complete. In service with Greece, Iran, Israel, Jordan, South Korea, Lebanon, Morocco, Pakistan, Portugal, Spain, Taiwan, Thailand, Tunisia, Turkey.

### MANUFACTURERS

Chrysler Corporation, Delaware; Ford Motor Company, Michigan; Fisher Body Division of General Motors Corporation, Michigan; and Alco Products, Schenectady, USA.



*Above: 105mm M48A5 in service with Thailand*



# M4Z Medium Tank (USA)

## KEY RECOGNITION

### FEATURES

- Well sloped glacis plate with 7.62mm MG in right bow, two hatches on opposite sides of hull immediately behind glacis plate, one for driver and one for bow gunner, turret in hull centre and engine compartment rear. Hull rear is vertical
- Cast turret with well sloped sides and bustle extending to rear with stowage box far rear, commander's cupola right side of turret roof, ventilation dome centre of roof at rear. 90mm gun has mantlet and T type or cylindrical muzzle brake with bore evacuator to immediate rear
- Suspension each side has six road wheels, idler front, drive sprocket rear and three track-return rollers, small track tensioning wheel between sixth road wheel and drive sprocket, no skirts

## SPECIFICATIONS

### Crew:

Armament: 1 x 90mm, 1 x 7.62mm MG (coaxial),  
1 x 7.62mm MG (bow),  
1 x 12.7mm MG (AA)

Ammunition: 71 x 90mm, 4,125 x 7.62mm,  
440 x 12.7mm

Length gun forwards: 8.508m

Length hull: 6.307m

Height to cupola: 3.016m

Height with AA MG: 3.352m

Width: 3.51m

Height to turret top: 2.954m

Ground clearance: 0.469m

Power-to-weight ratio: 17.54hp/tonne

Weight, combat: 46,170kg

Weight, empty: 42,130kg

Ground pressure: 0.935kg/cm<sup>2</sup>

Engine: Continental AV-1790-5B series V-12  
air-cooled petrol, 810hp at 2,800rpm

Maximum road speed: 48km/hr

Maximum range: 130km

Fuel capacity: 875 lit

Fording: 1.219m

Vertical obstacle: 0.914m

Trench: 2.59m

Gradient:

Side slope: 40%

Armour: 101mm (maximum)

Armour type: Steel

NBC system: None

Night vision equipment: Yes (infra-red for driver)

## DEVELOPMENT

M47 was developed in the early 1950s, essentially the turret of the T42 medium tank fitted to the chassis of the M46 tank. A total of 8,676 vehicles was produced. In the US Army the M47 was soon replaced by the M48 and most M47s were then supplied to other countries under the Mutual Aid Program; in most of these (eg France and Germany) it has long since been replaced by more modern vehicles.

The driver sits front in left side, bow machine gunner to right, turret centre and engine and transmission rear. The commander and gunner sit right of the turret, loader left. The



*Right: M47*



## LIGHT TANKS AND MAIN BATTLE TANKS

turret power-traverses through 360° and the 90mm gun elevates from -5° to +19° and fires APC-T, APERS-T, AP-T, canister, HE, HE-T, HEP-T, HEAT, HVAP-T, HVTP-T and smoke rounds. 7.62mm MG is mounted coaxial to left of main armament, with a similar weapon in the bow; many countries removed this weapon to accommodate additional ammunition. A 12.7mm M2 HB MG is mounted on the roof for air defence.

### VARIANTS

Many countries and companies have upgraded M47s at various times, but only Iran have them in any quantity. The Iranian vehicles retain their 90mm guns but have many automotive components (eg. engine and transmission) of the M48A3/M60A1; these are designated M47M.

South Korea has an M47 ARV in service, essentially an M47 with 90mm gun removed and winch in turret.

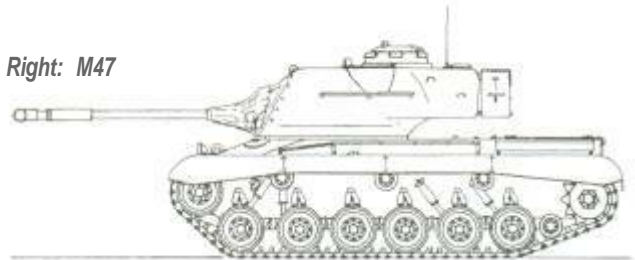
### STATUS

Production complete. In service with, Iran, Pakistan, South Korea and Former Yugoslavia.

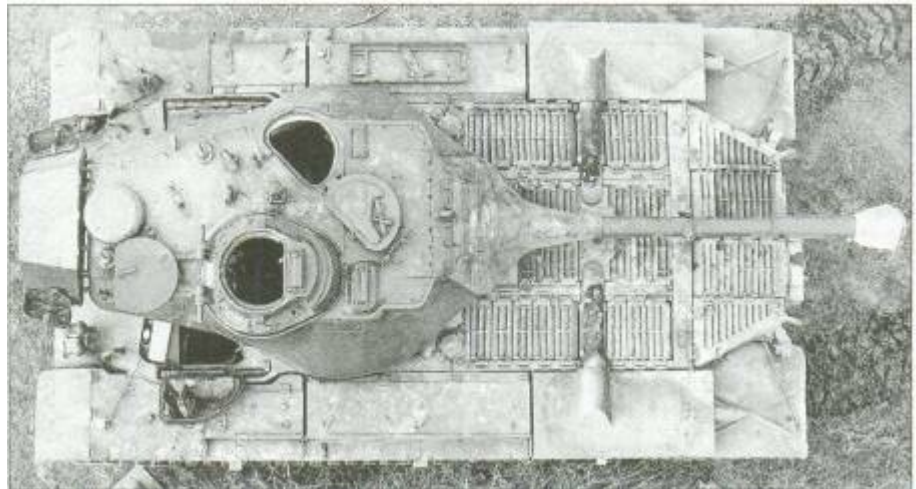
### MANUFACTURERS

Detroit Tank Plant and American Locomotive Company, USA.

*Right: M47*



*Below: M47  
(US Army)*



# M41 Light Tank (USA)

## KEY RECOGNITION

### FEATURES

- Well sloped glacis plate with horizontal top, driver front left, turret centre, engine rear, exhaust pipe each side of upper hull rear
- Welded turret with sloping sides, bustle overhanging rear, stowage box far rear, commander's cupola on right side, 76mm gun has T-shaped muzzle brake with fume extractor to immediate rear
- Suspension has five road wheels, drive sprocket rear, idler front, three return rollers, no skirts

## SPECIFICATIONS

|                               |                                                                                                      |
|-------------------------------|------------------------------------------------------------------------------------------------------|
| Crew:                         | 4                                                                                                    |
| Armament:                     | 1 x <b>76mm</b> , 1 x 7.62mm MG (coaxial),<br>1 x 12.7mm MG (AA)                                     |
| Ammunition:                   | 57 x 76mm, 5,000 x 7.62mm,<br>2,175 12.7mm                                                           |
| Length <b>gun</b> forwards:   | 8.212m                                                                                               |
| Length hull:                  | 5.819m                                                                                               |
| Height with <b>12.7mm</b> MG: | 3.075m                                                                                               |
| Height to turret top:         | 2.726m                                                                                               |
| Ground clearance:             | 0.45m                                                                                                |
| Weight, combat:               | 23,495kg                                                                                             |
| Weight, empty:                | 18,457kg                                                                                             |
| Power-to-weight ratio:        | 21.26hp/tonne                                                                                        |
| Engine:                       | Continental AOS-895-3, 6-cylinder<br>air-cooled supercharged petrol<br>developing 800bhp at 2,800rpm |
| <b>Maximum</b> road speed:    | 72km/hr                                                                                              |
| <b>Maximum</b> range:         | 161km                                                                                                |
| <b>Fuel</b> capacity:         | 530 lit                                                                                              |
| Fording:                      | 1.016m                                                                                               |
| Fording with preparation:     | 2.44m                                                                                                |
| Vertical obstacle:            | 0.711m                                                                                               |
| Trench:                       | 1.828m                                                                                               |
| Gradient:                     | 60%                                                                                                  |
| Side slope:                   | <b>30%</b>                                                                                           |
| Armour:                       | 31.75mm (maximum)                                                                                    |
| Armour type:                  | Steel                                                                                                |
| NBC system:                   | None                                                                                                 |
| Night vision equipment:       | Optional                                                                                             |

## DEVELOPMENT

M41 was developed shortly after the Second World War to replace the M24 Chaffee light tank. First production vehicles were completed in mid-1951 and 5,500 vehicles were completed by the late 1950s. In US Army service it was replaced by the M551 Sheridan light tank.

Driver sits front left, turret in centre and engine and transmission rear. Commander sits on turret right with gunner in front and loader on left side of turret

The 76mm gun power-elevates from -9° to +19° with turret traverse 360°, and fires HE, HEAT, HVAP-DS-T, HVAP-T, HVTP-T, smoke and training rounds. A 7.62mm MG is mounted coaxial to left and a 12.7mm M2 HB MG is mounted on turret roof for anti-aircraft defence.

## VARIANTS

M41 was followed in production by the slightly different M41A1, M41A2 and M41A3.

Bernardini of Brazil has rebuilt over 400 M41s for the Brazilian Army and Marines, with modifications including new engine, additional armour and gun bored out to 90mm; these are designated M41/B or M41/C.

Denmark has upgraded its vehicles to DK-1 standard with many improvements including new engine, NBC system, thermal sights and skirts. Some of the vehicles used by Uruguay have new 90mm Cockerill Mk IV gun.

## Status

Production complete. In service with Brazil, Chile, Denmark, Dominican Republic, Guatemala, Taiwan, Thailand and Uruguay.

**MANUFACTURER**

Cadillac Motor Car Division,  
General Motors Corporation,  
Cleveland Tank Plant, Ohio,  
USA.



*Right: Danish Army  
upgraded M41 which  
is called the DK-1*

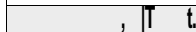
# Cadillac Gage Stingray Light Tank (USA)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver's hatch in upper part, hull top horizontal with two slight steps to raised engine compartment at rear of hull. Sides and rear of hull vertical with exhaust outlet in upper part of hull rear
- Turret in centre of hull with pointed front, sides slope inwards with turret basket at rear, bank of four smoke grenade dischargers on either side of the turret. 12.7mm MG mounted on right side of turret roof
- Suspension either side has six small road wheels with idler front, drive sprocket rear and three track return rollers, no side skirts

## SPECIFICATIONS

|                         |                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------|
| Crew:                   | 4                                                                                       |
| Armament:               | 1 x 105mm gun, 1 x 7.62mm MG coaxial, 1 x 12.7mm MG AA, 2 x 4 smoke grenade dischargers |
| Ammunition:             | 32 x 105mm, 2,400 x 7.62mm, 1,100 x 12.7mm                                              |
| Length gun forwards:    | 9.30m                                                                                   |
| Length hull:            | 6.448m                                                                                  |
| Width:                  | 2.71m                                                                                   |
| Height overall:         | 2.55m                                                                                   |
| Ground clearance:       | 0.46m                                                                                   |
| Weight, combat:         | 21,205kg                                                                                |
| Weight, empty:          | 19,387kg                                                                                |
| Power-to-weight ratio:  | 25.9hp/tonne                                                                            |
| Ground pressure:        | 0.72kg/cm <sup>2</sup>                                                                  |
| Engine:                 | Detroit Diesel Model 8V-92TA developing 535hp at 2,300rpm                               |
| Maximum road speed:     | 67km/hr                                                                                 |
| Maximum range:          | 483km                                                                                   |
| Fuel capacity:          | 757 lit                                                                                 |
| Fording:                | 1.07m                                                                                   |
| Vertical obstacle:      | 0.76m                                                                                   |
| Trench:                 | 2.13m                                                                                   |
| Gradient:               | 60%                                                                                     |
| Side slope:             | 40%                                                                                     |
| Armour:                 | Classified                                                                              |
| Armour type:            | Steel                                                                                   |
| NBC system:             | Yes (optional)                                                                          |
| Night vision equipment: | Yes (passive)                                                                           |



**Above: Cadillac Gage Stingray II light tank**

## DEVELOPMENT

The Stingray light tank was designed by Textron Marine ft Land Systems (previously Cadillac Gage Textron) as a private venture with the first prototype being completed in 1985. Following trials in Thailand this country placed an order for a total of 106 Stingray vehicles which were delivered between 1988 and 1990. To reduce procurement and life cycle costs, standard components have been used wherever possible in the design of the vehicle, for example engine, transmission, suspension and tracks.

The driver is seated at the front of the vehicle in the centre with the turret in the centre of the hull and the powerpack at the rear. The commander and gunner are seated on the right of the turret with the loader on the left. Main armament comprises a Royal Ordnance Nottingham 105mm Low Recoil Force gun that is fitted with a thermal sleeve, fume extractor and muzzle brake, this can fire the full range of NATO ammunition including APFSDS types. Turret traverse is a full 360° with weapon elevation from -7.5° to +20° under full power control with manual controls being provided for emergency use.

The commander and gunner are provided with day/night sights with the gunner's sight incorporating a laser rangefinder, a HR Textron gun control and stabilisation system is fitted as is

## LIGHT TANKS AND MAIN BATTLE TANKS



a Marconi Digital Fire Control System for improved first round hit probability. Various other types of fire control and night vision equipment can be fitted as can additional armour protection, land navigation system and fire detection and suppression system.

### **VARIANTS**

Chassis can be adopted for other roles. Further development has resulted in Stingray II with a number of improvements including additional armour protection. The first production version of the Stingray is sometimes referred to as the Stingray I. All marketing is now being concentrated on the Stingray II.

### **STATUS**

Production as required. In service with Thailand.

### **MANUFACTURER**

Textron Marine ft Land Systems, New Orleans, Louisiana, USA.

*Above.  
Cadillac  
Gage  
Stingray I  
light tank*

*Top right:  
Cadillac  
Gage  
Stingray I  
light tank*

*Right:  
Cadillac  
Gage  
Stingray I  
light tank*



## M-84 MBT (Former Yugoslavia)

### KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver's position top centre, distinctive V splash plate on glacis, turret centre of hull, engine and transmission at rear, exhaust outlet on left side hull above last road wheel station
- Circular turret, raised cupola with external 12.7mm MG on right of roof, stowage box rear and right, snorkel left side, infra-red searchlight right of 125mm gun which has thermal sleeve and fume extractor. Unditching beam and long-range fuel drums sometimes fitted at rear. Mounted on forward part of turret roof is distinctive pole type sensor for the fire control system which is not seen on the Russian T-72 MBT
- Suspension each side has six road wheels, drive sprocket rear, idler front and three track return rollers. Upper part usually covered by rubber skirts

### SPECIFICATIONS

|                         |                                                                                                                      |
|-------------------------|----------------------------------------------------------------------------------------------------------------------|
| Crew:                   | 3                                                                                                                    |
| Armament:               | 1 x 125mm, 1 x 7.62mm (coaxial), 1 x 12.7mm MG (AA), 11 smoke grenade discharges (one bank of five and one of seven) |
| Ammunition:             | 42 x 125mm, 2000 x 7.62mm, 300 x 12.7mm                                                                              |
| Length gun forwards:    | 9.53m                                                                                                                |
| Length hull:            | 6.86m                                                                                                                |
| Width:                  | 3.57m                                                                                                                |
| Height (turret roof):   | 2.19m                                                                                                                |
| Ground clearance:       | 0.5m                                                                                                                 |
| Weight, combat:         | 42,000kg                                                                                                             |
| Power-to-weight ratio:  | 23.8hp/tonne                                                                                                         |
| Ground pressure:        | 0.81 kg/cm <sup>2</sup>                                                                                              |
| Engine:                 | V-12 water-cooled, supercharged diesel developing 780hp at 2,000rpm                                                  |
| Maximum road speed:     | 65km/hr                                                                                                              |
| Range:                  | 700km                                                                                                                |
| Fuel capacity:          | 1,450 lit (estimate)                                                                                                 |
| Fording:                | 1.2m (without preparation), 5m (with snorkel)                                                                        |
| Vertical obstacle:      | 0.85m                                                                                                                |
| Trench:                 | 2.8m                                                                                                                 |
| Gradient:               | 60%                                                                                                                  |
| Side slope:             | 30%                                                                                                                  |
| Armour:                 | Classified                                                                                                           |
| Armour type:            | Composite/steel                                                                                                      |
| NBC system:             | Yes                                                                                                                  |
| Night vision equipment: | Yes (commander, gunner and driver)                                                                                   |

### DEVELOPMENT

The M-84 is essentially the Russian T-72 manufactured under licence in Yugoslavia with a number of Yugoslav designed sub-systems, for example the fire control system. The first prototypes of the M-84 were completed in 1982-83 with production commencing in 1983-84 and first production vehicles being completed in 1984. It is estimated that by early 1992 over 600 had been built for the home and export markets. Following the Yugoslav war, production of the M-84 stopped although more recently Croatia has unveiled an MBT called the M-95 Degman which is similar to M-84 but has a new armour package.

The layout of the M-84 is identical to that of the T-72 with the driver being seated at the front of the vehicle in the centre, two man turret in the centre of the hull with the gunner on the left and commander on the right with the powerpack at the rear. The M-84 has no loader as the vehicle is fitted with an automatic loader for the 125mm gun, which has an elevation of +13° and a depression of -6° with turret traverse a full 360°, turret controls are powered with manual controls for emergency use. Types of 125mm ammunition fired include HE-FRAG, HEAT-FS and APFSDS-T.

### VARIANTS

ARV, believed to exist although no firm details are available. M-84A, latest production model with a number of improvements including a more powerful 1,000hp engine that gives a higher speed and improved power-to-weight ratio, it also has improved armour protection. M-84AB, version for Kuwait, now built in Slovenia who also builds M84A4 Snajper (Sniper).



**STATUS**

Production complete. In service with Croatia, Kuwait, Libya (unconfirmed), Slovenia, Syria (unconfirmed) and Yugoslavia.

**MANUFACTURER**

Former Yugoslav state factories.



*Right: T-72 MBT*



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# **TRACKED APCs/ WEAPONS CARRIERS**

# Steyr 4K 7FA G 127 APC (Austria)

## KEY RECOGNITION FEATURES

- Almost identical to 4K 4FA series (qv) with low profile hull, well sloped glacis plate leading up to horizontal hull top, hull rear slopes sharply inwards, hull sides above tracks slope inwards, horizontal louvres each side of hull front
- Driver front left, engine right, weapon station to his immediate rear (normally cupola with 12.7mm MG)
- Suspension with five road wheels which all have small holes between hub and rim, drive sprocket front, idler rear, three track-return rollers, no skirts

## SPECIFICATIONS

|                         |                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------|
| Crew:                   | 2+8                                                                                 |
| Armament:               | 1 x 12.7mm MG, 4 x smoke grenade dischargers                                        |
| Ammunition:             | 500 x 12.7mm (estimate)                                                             |
| Length:                 | 5.87m                                                                               |
| Width:                  | 2.5m                                                                                |
| Height without MG:      | 1.611m                                                                              |
| Ground clearance:       | 0.42m                                                                               |
| Weight, combat:         | 14,800kg                                                                            |
| Power-to-weight ratio:  | 21.62hp/tonne                                                                       |
| Ground pressure:        | 0.55kg/cm <sup>2</sup>                                                              |
| Engine:                 | Steyr 7FA 6-cylinder liquid-cooled turbocharged diesel developing 320hp at 2,300rpm |
| Maximum road speed:     | 70.6km/hr                                                                           |
| Maximum road range:     | 520km                                                                               |
| Fuel capacity:          | 360 lit                                                                             |
| Fording:                | 1m                                                                                  |
| Vertical obstacle:      | 0.8m                                                                                |
| Trench:                 | 2.1m                                                                                |
| Gradient:               | 75%                                                                                 |
| Side slope:             | 40%                                                                                 |
| Armour:                 | 25mm (maximum)                                                                      |
| Armour type:            | Steel                                                                               |
| NBC system:             | Yes                                                                                 |
| Night vision equipment: | Yes (passive for driver)                                                            |

## DEVELOPMENT

The Steyr 4K 7FA G 127 is a further development of the earlier 4K 4FA series (see following entry). The first prototype was completed in 1976 and first production vehicles in 1977. Main

improvements over earlier Saurer 4K 4FA are better armour protection over frontal arc and improved power-to-weight ratio from more powerful engine. Many automotive components also used in SK 105 tank destroyer.

Driver sits front left, engine compartment to his right, cupola with externally mounted 12.7mm M2 HB MG to his rear. Cupola has front and side armour protection for gunner, rear has bank of four electrically operated smoke grenade dischargers firing to rear. Troop compartment is rear of hull, has roof hatches that open each side and twin doors in rear. Four sockets around top of troop compartment allow quick installation of pintle-mounted MGs.

Standard equipment includes ventilation system and crew compartment heater. Optional equipment includes passive NVE, NBC system, air conditioning and fire detection/suppression system for engine and crew compartments.

## VARIANTS

4K 7FA-KSPz MICV has two ball-type firing ports in each side of troop compartment with periscope for rifle fired from inside. 4K 7FA MICV essentially as above with one-man turret and 12.7mm MG and 7.62mm MG, prototype only.

4K 7KA FSCV 90 fire support vehicle has GIAT 90mm TS-90 turret fitted, prototype only.

4K 7FA MICV 30/1 with one-man turret and 30mm RARDEN cannon and 7.62mm coaxial MG, prototype only.

4K 7FA-F, command post vehicle has additional communications equipment.

4K 7FA-San is armoured ambulance.

4K 7FA AMC 81 is 81mm mortar carrier.

4K 7FA FLA 1/2.20 twin 20mm SPAAG, prototype only.

4K 7FA FLA 3/2.30 twin 30mm SPAAG, prototype only.

**STATUS**

Production complete. In service with Bolivia, Cyprus, Greece and Nigeria.

**MANUFACTURERS**

Steyr-Daimler-Puch AG,  
Vienna, Austria; Steyr Hellas  
SA, Greece.

*Right: Steyr  
4K 7FA G 127*





# Saurer 4K 4FA APC (Austria)

## KEY RECOGNITION FEATURES

- Low profile hull with well sloped glacis plate leading up to horizontal hull top, hull rear slopes sharply inwards, hull sides above tracks slope slightly inwards, horizontal louvres each side of hull front
- Driver front left, engine right, weapon station to immediate rear (turret with 20mm cannon or 12.7mm MG)
- Suspension with five road wheels which all have small holes between hub and rim, drive sprocket front, idler rear, two track-return rollers, no skirts

## SPECIFICATIONS

|                                       |                                                                          |
|---------------------------------------|--------------------------------------------------------------------------|
| Crew:                                 | 2+8                                                                      |
| Armament:                             | 1 x 20mm cannon or 1 x 12.7mm MG                                         |
| Length:                               | 5.4m                                                                     |
| Width:                                | 2.5m                                                                     |
| Height with 12.7mm MG:                | 2.1m                                                                     |
| Height hull top:                      | 1.65m                                                                    |
| Ground clearance:                     | 0.42m                                                                    |
| Weight, combat (20mm cannon):         | 15,000kg                                                                 |
| Weight, combat (12.7mm MG):           | 12,500kg                                                                 |
| Power-to-weight ratio (20mm model):   | 16.66hp/tonne                                                            |
| Power-to-weight ratio (12.7mm model): | 20hp/tonne                                                               |
| Ground pressure:                      | 0.52kg/cm <sup>2</sup>                                                   |
| Engine:                               | Saurer model 4FA 4-stroke 6-cylinder diesel developing 250hp at 2,400rpm |
| Maximum road speed:                   | 65km/hr                                                                  |
| Maximum road range:                   | 370km                                                                    |
| Fuel capacity:                        | 184 lit                                                                  |
| Fording:                              | 1m                                                                       |
| Vertical obstacle:                    | 0.8m                                                                     |
| Trench:                               | 2.2m                                                                     |
| Gradient:                             | 75%                                                                      |
| Side slope:                           | 50%                                                                      |
| Armour:                               | 20mm (maximum)                                                           |
| Armour type:                          | Steel                                                                    |
| NBC system:                           | None                                                                     |
| Night vision equipment:               | None                                                                     |

## DEVELOPMENT

In the mid-1950s Saurer-Werke designed and built a full tracked armoured personnel carrier, further development of which resulted in 4K 4F which entered production for Austrian Army in 1961. Replaced in production by 4K 3FA (230hp engine) and 4K 4FA (250hp engine) with final deliveries in 1968 after about 450 had been built. Further development resulted in the similar 4K 7FA APC (qv).

All vehicles have similar layout with driver front left, engine compartment to his immediate right. Main armament is to rear of driver, troop compartment extending to rear with roof hatches. Troops enter via twin doors in rear.

## VARIANTS

4K 4FA-G1 has cupola with 12.7mm MG.  
4K 4FA-G2 has a one-man Oerlikon Contraves turret armed with one Oerlikon Contraves 20mm 204GK cannon. Turret traverse is a full 360° with weapon elevation from -12° to +70°. 4K 3FA Fu'1 is brigade command post vehicle.  
4K 3FA Fu'A is artillery command post vehicle.  
4K 3FA Fii/FIA is anti-aircraft command post vehicle.  
4K 3FA-FS is wireless teleprinter vehicle.  
4K 4FA-San is armoured ambulance.  
4K 4F GrW1 is 81mm mortar carrier.

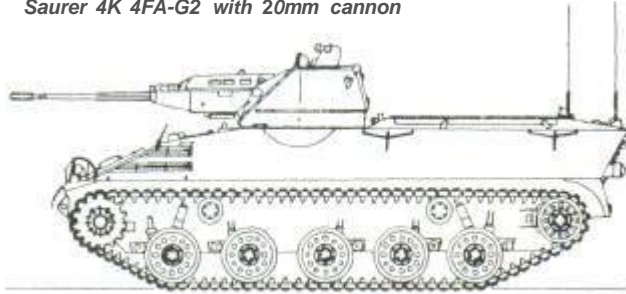
## STATUS

Production complete. In service with Austrian Army only.

## MANUFACTURER

Saurer-Werke (now Steyr-Daimler-Puch), Vienna, Austria.

*Saurer 4K 4FA-G2 with 20mm cannon*



*Right: Saurer 4K 4FA-G2 with 20mm cannon (Stefan Marx)*

*Below right: Saurer 4K 3FA with 12.7mm MG (Stefan Marx)*

*Below: Saurer 4K 4FA-San armoured ambulance (Stefan Marx)*



# BMP-23 Infantry Combat Vehicle (Bulgaria)

## KEY RECOGNITION FEATURES

- Chassis has nose sloping back under hull with almost horizontal glacis plate, horizontal hull top, vehicle hull rear and sides are vertical with chamfer between sides and hull top
- Turret mounted in centre of vehicle with sloping front, 23mm cannon has muzzle suppressor and slots. Sagger ATGW mounted on left side of turret roof
- Chassis is similar to Russian 2S1 122mm SPG willi bcvcn road wheels, drive sprockets at front, idler at rear and no track return rollers

## SPECIFICATIONS

|                         |                                                                         |
|-------------------------|-------------------------------------------------------------------------|
| Crew:                   | 3+7                                                                     |
| Armament:               | 1 x 23mm cannon, 1 x 7.62mm MG (coaxial), 1 x AT-3 Sagger ATGW launcher |
| Ammunition:             | 600 x 23mm, 2,000 x 7.62mm and 4 x AT-3 Sagger ATGW                     |
| Length:                 | 7.285m                                                                  |
| Width:                  | 2.85m                                                                   |
| Height:                 | 2.53m                                                                   |
| Ground clearance:       | 0.40m                                                                   |
| Weight, combat:         | 15,200kg                                                                |
| Power-to-weight ratio:  | 20.72hp/tonne                                                           |
| Ground pressure:        | 0.498kg/cm <sup>2</sup>                                                 |
| Engine:                 | Diesel developing 315hp                                                 |
| Maximum road speed:     | 61.5km/hr                                                               |
| Maximum road range:     | 550-600km                                                               |
| Fuel capacity:          | 500 to 560 lit                                                          |
| Fording:                | Amphibious                                                              |
| Vertical obstacle:      | 0.8m                                                                    |
| Trench:                 | 2.5m                                                                    |
| Gradient:               | 60%                                                                     |
| Side slope:             | 30%                                                                     |
| Armour:                 | Classified                                                              |
| Armour type:            | Steel                                                                   |
| NBC system:             | Yes                                                                     |
| Night vision equipment: | Yes                                                                     |

## DEVELOPMENT

The BMP-23 ICV was developed by the Bulgarian defence industry to meet the requirements of the Bulgarian Army and

uses a number of components of the Russian MT-LB multi-purpose armoured vehicle and 2S1 122mm self-propelled artillery system that have been manufactured under licence in Bulgaria for some time.

The driver is seated at the front left with one of the infantrymen on the opposite side of the vehicle with the engine to their rear, the two man turret is in the centre of the vehicle with gunner on the left and commander on the right. The 23mm cannon has a maximum range of 2,000m with the 7.62mm MG being mounted coaxial to the right. The AT-3 ATGW has a maximum range of 3,000m. The infantry compartment is at the rear with three men being seated either side back to back, the infantry enter the BMP-23 via doors in the hull rear. The troop compartment is provided with firing ports, associated vision devices and roof hatches.

The BMP-23 is fully amphibious being propelled in the water by its tracks and before entering the water a trim vane is erected at the front of the hull, which when not required folds back onto the glacis plate. Standard equipment includes heater, fire detection and suppression system and navigation system. It can also lay its own smoke screen by injecting diesel fuel into the exhaust outlet on the right side of the hull.

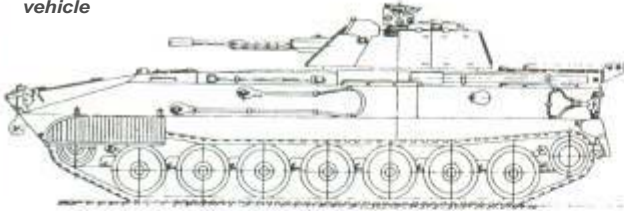
## VARIANTS

BMP-23A, is BMP-23 with three smoke grenade dischargers either side of turret and launcher on roof for AT-4 Spigot ATGW launcher. BRM-23 is a reconnaissance vehicle with a similar layout and weapon fit but has a five-man crew and additional surveillance equipment.

BMP-30 is essentially BMP-23 fitted with complete turret of Russian BMP-2 ICV which is armed with a 30mm cannon,

## TRACKED APCs /WEAPONS CARRIERS

**BMR-23 reconnaissance vehicle**



7.62mm coaxial machine gun, launcher for AT-4/AT-5 ATGW and a bank of three smoke grenade dischargers mounted either side of the turret.

### STATUS

Production as required. In service with Bulgarian Army.

### MANUFACTURER

Bulgarian state factories.

*Above right:*  
**BMP-30 ICV**

*Right:* **BMP-23 ICV**



# NORINCO YW 531 H APC (China)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with nose sloped back under front of vehicle, horizontal hull top with distinctive domed hatch cover for driver at front left of vehicle, 12.7mm MG on roof provided with lateral and rear protection
- Hull sides slope slightly inwards, vertical hull rear with single large door, either side of which is a large box that protrudes to the rear
- Suspension either side consists of five road wheels with drive sprocket at the front, idler at the rear and track-return rollers, the upper part of which are covered by a light steel skirt with horizontal ribs

## SPECIFICATIONS

|                         |                                                  |
|-------------------------|--------------------------------------------------|
| Crew:                   | 2+13                                             |
| Armament:               | 1 x 12.7mm MG                                    |
| Ammunition:             | 1,120x 12.7mm                                    |
| Length:                 | 6.125m                                           |
| Width:                  | 3.06m                                            |
| Height:                 | 2.586m (inc 12.7mm MG),<br>1.914m (hull roof)    |
| Ground clearance:       | 0.46m                                            |
| Weight, combat:         | 13,600kg                                         |
| Power-to-weight ratio:  | 23.5hp/tonne                                     |
| Ground pressure:        | 0.546kg/cm <sup>2</sup>                          |
| Engine:                 | BF8L 41 3F air-cooled diesel<br>developing 320hp |
| Maximum road speed:     | 65km/hr                                          |
| Maximum road range:     | 500km                                            |
| Fuel capacity:          | Not available                                    |
| Fording:                | Amphibious                                       |
| Vertical obstacle:      | 0.6m                                             |
| Trench:                 | 2.2m                                             |
| Gradient:               | 60%                                              |
| Side slope:             | 40%                                              |
| Armour:                 | Classified                                       |
| Armour type:            | Steel                                            |
| NBC system:             | Yes                                              |
| Night vision equipment: | Yes                                              |

## DEVELOPMENT

The YW 531 H APC was developed by NORINCO at the same time as the very similar YW 534, the main difference being that the YW 531 H is slightly lighter, shorter, narrower and does not have the bank of four electrically operated smoke grenade

dischargers either side of the turret. The driver is seated at the front of the vehicle on the left with another crew member to his rear, to their right is the engine compartment. The troop compartment is to the rear of the hull and is provided with four small roof hatches and a single door in the rear, firing ports and observation devices are provided. On the basic vehicle armament comprises a ring-mounted 12.7mm MG with lateral and side protection. The YW 531 is fully amphibious being propelled in the water by its tracks and before entering the water the trim vane is erected on the glacis plate and the bilge pumps are switched on.

## VARIANTS

YW 309 ICV with turret of WZ 501 (the Chinese equivalent of the Russian BMP-1).

Type 85 armoured command post vehicle, similar to basic vehicle but has additional communications equipment, Type 85 armoured command vehicle is almost identical.

Type WZ 751 armoured ambulance, has raised rear compartment.

Type 85 120mm self-propelled mortar.

Type 85 82mm self-propelled mortar.

122mm self-propelled howitzer, uses mount and ordnance of Chinese produced version of the Russian 122mm D-30 howitzer.

Type 85 ARV, fitted with hydraulic crane.

Type 85 maintenance engineering vehicle, has raised hull like Type 85 ambulance.

## STATUS

Production. In service with China, Myanmar and Thailand (these have US M2 type 12.7mm MGs in place of Chinese MGs).

**MANUFACTURER**

Chinese state  
factories. Marketed  
by NORINCO.

*Inset: Type WZ  
751*

*Main picture:  
Type YW531 H  
APC*



# NORINCO YW 531C APC (China)

## KEY RECOGNITION FEATURES

- Nose slopes back under forward part of hull, well sloped glacis plate up to hull top that slopes slightly upwards towards rear. Vertical hull rear with large door that opens right
- Hull sides slope slightly inwards, driver front left, similar hatch cover front right, air inlet louvres in roof on right side, oblong hatches in roof over rear troop compartment
- Suspension each side has four road wheels, idler rear, drive sprocket front, no track-return rollers, upper part of track covered by sheet metal guard

## SPECIFICATIONS

|                         |                                                                         |
|-------------------------|-------------------------------------------------------------------------|
| Crew:                   | 2+13                                                                    |
| Armament:               | 1 x 12.7mm MG                                                           |
| Ammunition:             | 1,120x 12.7mm                                                           |
| Length:                 | 5.476m                                                                  |
| Width:                  | 2.978m                                                                  |
| Height with MG:         | 2.58m                                                                   |
| Height to hull top:     | 1.887m                                                                  |
| Ground clearance:       | 0.45m                                                                   |
| Weight, combat:         | 12,600kg                                                                |
| Power-to-weight ratio:  | 25.39hp/tonne                                                           |
| Ground pressure:        | 0.57kg/cm <sup>2</sup>                                                  |
| Engine:                 | BF8L 413F 4-cycle turbocharged, V-8 diesel developing 320hp at 2,500rpm |
| Maximum road speed:     | 65km/hr                                                                 |
| Maximum water speed:    | 6km/hr                                                                  |
| Maximum range:          | 500km                                                                   |
| Fuel capacity:          | 450 lit                                                                 |
| Fording:                | Amphibious                                                              |
| Vertical obstacle:      | 0.6m                                                                    |
| Trench:                 | 2m                                                                      |
| Gradient:               | 60%                                                                     |
| Side slope:             | 40%                                                                     |
| Armour:                 | 10mm (maximum)(estimate)                                                |
| Armour type:            | Steel                                                                   |
| NBC system:             | None                                                                    |
| Night vision equipment: | None                                                                    |

## DEVELOPMENT

The YW 531 series was developed by NORINCO (China North Industries Corporation) in the late 1960s. (It has been referred to as K-63, M1967, M1970 and Type 63 at various times.) Driver sits

front left with vehicle commander to rear, another crew member sits front right with engine compartment to rear, 12.7mm MG is mounted in centre of roof, no protection for gunner. Troop compartment at rear of hull with two hatches above, large door in rear and single firing port in each side of hull.

YW 531 is fully amphibious, propelled by its tracks. Before entering the water a trim vane is erected at front of vehicle and bilge pumps switched on.

## VARIANTS

YW 531 C (modified) has shield for 12.7mm MG.

YW 531C. YW 531D. YW 531E, all have additional communications.

WZ 701 command post vehicle has higher roof line at rear.

YW 750 ambulance is similar to above.

Type 54-1 122mm self-propelled howitzer uses components of YW531.

130mm Type 70 self-propelled rocket launcher uses components of YW 531.

YW 304 82mm mortar carrier, mortar can be dismounted.

YW 381 120mm mortar carrier, mortar can be dismounted.

Anti-tank vehicle with turret armed with four Red Arrow 8 ATGWs in ready-to-launch position.

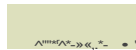
Further development has resulted in the NORINCO Type YW 531 H (or Type 85 as it is also referred to)(qv). The NORINCO WZ 501 IFV is essentially a Chinese-built version of the Russian BMP-1 vehicle.

## STATUS

Production complete. In service with Albania, China, Democratic Republic of Congo, Iraq, North Korea, Sudan, Tanzania and Vietnam.



## TRACKED APCs/WEAPONS CARRIERS



**MANUFACTURER**  
Chinese state arsenals

*Above: Type YW  
701 command  
post vehicle*

*Above right: Type  
YW 304 82mm  
self-propelled  
mortar*

*Right: Type YW  
531 (Paul Handel)*

# NORINCO Type 77 APC (China)

## KEY RECOGNITION

### FEATURES

- Similar in appearance to the Russian BTR-50PK and Czechoslovak OT-62 with high nose sloping back under forward part of hull, almost horizontal glacis plate, forward part of crew compartment slopes rear, half-circular commander's position in right side, hull top horizontal to mid-way along vehicle then drops vertically to engine compartment at rear
- Hull rear and sides vertical, upper part of hull sides slope inwards, door in right side of hull opens forwards
- Suspension each side has six road wheels, idler front, drive sprocket rear, no track-return rollers

## SPECIFICATIONS

|                         |                                                                                                                |
|-------------------------|----------------------------------------------------------------------------------------------------------------|
| Crew:                   | 2+16                                                                                                           |
| Armament:               | 1 x 12.7mm MG                                                                                                  |
| Ammunition:             | 500 x 12.7mm                                                                                                   |
| Length:                 | 7.4m                                                                                                           |
| Width:                  | 3.2m                                                                                                           |
| Height:                 | 2.436m                                                                                                         |
| Weight, combat:         | 15,500kg                                                                                                       |
| Power-to-weight ratio:  | 25.8hp/tonne                                                                                                   |
| Engine:                 | Type 12150L-2A4-cycle, compression ignition, direct injection water-cooled diesel developing 400hp at 2,000rpm |
| Maximum road speed:     | 60km/hr                                                                                                        |
| Maximum water speed:    | 11 to 12km/hr                                                                                                  |
| Maximum road range:     | 370km                                                                                                          |
| Fuel capacity:          | 41.6 lit                                                                                                       |
| Fording:                | Amphibious                                                                                                     |
| Vertical obstacle:      | 0.87m                                                                                                          |
| Trench:                 | 2.9m                                                                                                           |
| Gradient:               | 60%                                                                                                            |
| Side slope:             | 40%                                                                                                            |
| Armour:                 | 8mm (maximum)(estimate)                                                                                        |
| Armour type:            | Steel                                                                                                          |
| NBC system:             | None                                                                                                           |
| Night vision equipment: | None                                                                                                           |

## DEVELOPMENT

Although very similar to Russian BTR-50PK and Czechoslovak OT-62 APCs, the Chinese Type 77 has a more powerful engine which gives higher road and water speeds and a higher power-to-weight ratio. Many automotive components of Type 77 are also used in the Type 63 APC. Fully enclosed crew and troop compartments are situated at the front, with entry via a door in right side and roof hatches. Engine and transmission are at the rear. Troop compartment has three firing ports, several vision blocks, ventilation system and a white light searchlight for use from inside vehicle.

The Type 77 is fully amphibious, propelled by two waterjets mounted one each side at hull rear. Before entering the water, a trim board is erected at front of vehicle and two bilge pumps switched on. The Type 77 can be used as command post, fuel resupply vehicle, ambulance and load carrier. The Type 77-2 has three loading ramps that can be positioned at rear to carry 85mm Type 56 gun or 122mm Type 54 howitzer. Type 77-2 has no ramps.

## VARIANTS

The only known variant is a lengthened chassis with seven road wheels which is to transport and launch the HQ-2J SAM which is the Chinese equivalent of the Russian SA-2 Guideline SAM system.

## STATUS

Production complete. In service with Chinese Army. Albania may have a small quantity of these vehicles in service.

## MANUFACTURER

Chinese state arsenals.



*Left: 77-2 with side door open*

# AMXVCI Infantry Combat Vehicle (France)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate which often has trim vane across front with spare road wheel above, flat hull top to rear of second road wheel station, almost vertical hull front and horizontal roof that extends to rear of vehicle, vertical hull with twin doors
- Armament mounted on left side of forward superstructure with commander to right. Hull sides vertical for first half of troop compartment sides then slope inwards, four firing ports each side
- Suspension each side has five road wheels, drive sprocket front, idler rear, up to four return rollers, no skirts

## SPECIFICATIONS

|                         |                                                                              |
|-------------------------|------------------------------------------------------------------------------|
| Crew:                   | 3+10                                                                         |
| Armament:               | 1 x 12.7mm MG                                                                |
| Ammunition:             | 1,000 x 12.7mm                                                               |
| Length:                 | 5.7m                                                                         |
| Width:                  | 2.67m                                                                        |
| Height with turret:     | 2.41m                                                                        |
| Height hull top:        | 2.1m                                                                         |
| Ground clearance:       | 0.48m                                                                        |
| Weight, combat:         | 15,000kg                                                                     |
| Weight, empty:          | 12,500kg                                                                     |
| Power-to-weight ratio:  | 16.67hp/tonne                                                                |
| Engine:                 | SOFAM model 8Gxb 8-cylinder water-cooled petrol developing 250hp at 3,200rpm |
| Maximum road speed:     | 60km/hr                                                                      |
| Maximum road range:     | 350km                                                                        |
| Fuel capacity:          | 410 lit                                                                      |
| Fording:                | 1m                                                                           |
| Vertical obstacle:      | 0.65m                                                                        |
| Trench:                 | 1.6m                                                                         |
| Gradient:               | 60%                                                                          |
| Side slope:             | 30%                                                                          |
| Armour:                 | 30mm (maximum)                                                               |
| Armour type:            | Steel                                                                        |
| NBC system:             | Optional                                                                     |
| Night vision equipment: | Optional                                                                     |

## DEVELOPMENT

The AMX VCI (Vehicule de Combat d'Infanterie) was developed in the 1950s and is based on the AMX-13 light tank chassis. First prototype completed in 1955, first production vehicles

completed at Atelier de Construction Roanne (ARE) in 1957. Once AMX-30 production was under way at the ARE production of the whole AMX-13 light family was transferred to Creusot Loire, Chalon sur Saone. This vehicle has been replaced in front line French Army service by the GIAT Industries AMX-10P series.

Layout of all versions is similar with driver front left, engine compartment to his right, commander and gunner in raised superstructure to his rear, troop compartment which extends right to rear of vehicle, troop entry via two doors in hull rear. Ten infantry sit five each side back to back, two two-piece hatch covers in each side of troop compartment (lower part of each has two firing ports and folds forwards into horizontal, upper part folds upwards through 180° to rest on troop compartment roof).

Wide range of optional equipment includes NBC system, night vision devices and turrets and cupolas armed with 7.62mm or 12.7mm MGs, 20mm cannon or 60mm breech-loaded mortar. Original petrol engine can be replaced by fuel-efficient Detroit Diesel 6V-71T developing 280hp at 2,800rpm or Baudouin 6F11SRV turbo-charged diesel developing 280hp at 3,200rpm.

## VARIANTS

Ambulance (VTT/TB) transports four seated and three stretcher patients.

Command post vehicle (VTT/PC) has extensive communications equipment.

Cargo (VTT/cargo) with 3,000kg capacity.

Anti-tank, AMX VCI fitted with MILAN or TOW ATGWs.

Fire-control vehicle (VTT/LT), battery command post vehicle for artillery units.

RATAC radar carrier (VTT/RATAC) with RATAC battlefield surveillance radar on roof.

## TRACKED APCs /WEAPONS CARRIERS

155mm Support Vehicle (VTT/VCA) operates with 155mm Mk F3 self-propelled gun and carries remainder of gun crew and ammunition. Also tows ammunition trailer.

81mm mortar carrier (VTT/PM) has 81mm mortar in rear firing through roof.

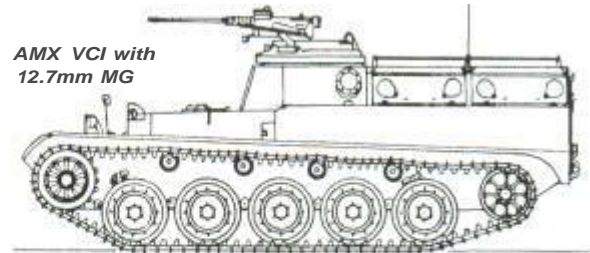
120mm mortar carrier (VTT/PM) has 120mm mortar in rear firing through roof.

### STATUS

Production complete. In service with Argentina, Cyprus (VTT/VCA and command post), Ecuador, Indonesia, Lebanon, Mexico, Qatar, Sudan, Venezuela and United Arab Emirates.

### MANUFACTURER

Creusot-Loire Industrie at Chalon sur Saone, France.



*Right: AMX VCI*

# GIAT AMX-IOP Infantry Combat Vehicle (France)

## KEY RECOGNITION FEATURES

- Pointed hull front with nose directed back under hull, well sloped glacis plate with driver's position on upper left side, horizontal roof with hull rear sloping slightly inwards, large power-operated ramp
- Turret mounted centre of roof, 20mm cannon mounted externally with 7.62mm MG to right, two outward-opening roof hatches to rear of turret. Hull sides vertical, no firing ports in sides of rear troop compartment, circular exhaust outlet in right side of hull above second/third roadwheel
- Suspension each side has five road wheels, drive sprocket front, idler rear, three track-return rollers. Upper part of track covered by skirt

## SPECIFICATIONS

|                         |                                                                                        |
|-------------------------|----------------------------------------------------------------------------------------|
| Crew:                   | 3+8                                                                                    |
| Armament:               | 1 x 20mm cannon, 1 x 7.62mm MG (coaxial), 2 x 2 smoke grenade dischargers              |
| Ammunition:             | 760 x 20mm, 2,000 x 7.62mm                                                             |
| Length:                 | 5.90m                                                                                  |
| Width:                  | 2.83m                                                                                  |
| Height overall:         | 2.83m                                                                                  |
| Height hull top:        | 1.95m                                                                                  |
| Ground clearance:       | 0.45m                                                                                  |
| Weight, combat:         | 14,500kg                                                                               |
| Weight, empty:          | 12,700kg                                                                               |
| Power-to-weight ratio:  | 17.93hp/tonne                                                                          |
| Ground pressure:        | 0.53kg/cm <sup>2</sup>                                                                 |
| Engine:                 | Hispano-Suiza HS-115 V-8 water-cooled supercharged diesel developing 260hp at 3,000rpm |
| Maximum road speed:     | 65km/hr                                                                                |
| Maximum water speed:    | 7km/hr                                                                                 |
| Maximum road range:     | 500km                                                                                  |
| Fuel capacity:          | 528 lit                                                                                |
| Fording:                | Amphibious                                                                             |
| Vertical obstacle:      | 0.7m                                                                                   |
| Trench:                 | 2.1m                                                                                   |
| Gradient:               | 60%                                                                                    |
| Side slope:             | 30°                                                                                    |
| Armour:                 | Classified                                                                             |
| Armour type:            | Aluminium                                                                              |
| NBC system:             | Yes                                                                                    |
| Night vision equipment: | Yes (driver, commander and gunner)                                                     |

## DEVELOPMENT

The AMX-10P was developed from 1965 by Atelier de Construction d'Issy-les-Moulineaux to meet requirements of French Army with first prototype completed in 1968 and first production vehicles in 1973. AMX-10 RC (6x6) armoured car (qv) uses automotive components of this vehicle. The driver sits front left, with engine compartment to right and troop compartment extending right to rear. A two-man (commander and gunner) power-operated turret is armed with 20mm cannon and 7.62mm coaxial MG. Turret traverses through 360°, weapons elevate from -8° to +50°. Troop compartment has roof hatches and periscopes, two firing ports in rear ramp. AMX-10P is fully amphibious, propelled by its waterjets, one mounted each side at hull rear. Before entering the water a trim vane is erected at front of vehicle and bilge pumps switched on.

## VARIANTS

AMX-10P 25 ICV, one-man 25mm turret, trials only.  
 AMX-10 ambulance is unarmed.  
 AMX-10P driver training vehicle has no turret.  
 AMX-10 ECH repair vehicle has one-man turret and hydraulic crane.  
 AMX-IOP HOT (anti-tank) has turret with four HOT ATGWs.  
 AMX-10 PC (command vehicle) has additional communications equipment.  
 AMX-10P with RATAC (radar for field artillery fire) on roof.  
 AMX-10 SAO (artillery observation vehicle) has turret with 7.62mm MG.  
 AMX-10 SAT (artillery survey vehicle).  
 AMX-10 TM (mortar tractor) tows 120mm TDA mortar.  
 AMX-10 VOA (artillery observer vehicle).  
 AMX-10Ps used in Atila artillery fire-control system include



## TRACKED APCs /WEAPONS CARRIERS

AMX-10 VFA, AMX-10 VLA and AMX-10 SAF.

AMX-10P Marine has been developed specifically for amphibious operations. Singapore has vehicle with 90mm TS-90 turret and 25mm Dragar turret while Indonesia has vehicle with TS-90 turret and 12.7mm MG turret.

### STATUS

Production as required. In service with France, Indonesia (Marines version), Iraq, Qatar, Saudi Arabia, Singapore (Marines version), and the United Arab Emirates.

### MANUFACTURER

GIAT Industries, Roanne, France



*Left: AMX-10P  
Marine with  
12.7mm MG*

*Above:  
AMX-10PICV*



# Marder 1 Infantry Combat Vehicle (Germany)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver on left leading up to horizontal roof with vertical hull rear, hull sides slope inwards above suspension, power-operated ramp in hull rear
- Large turret with sloping front, sides and rear on roof with externally mounted 20mm cannon and smoke grenade dischargers on left
- Suspension with six rubber-tyred road wheels, drive sprocket front, idler rear, three track-return rollers. Upper part of suspension normally covered by track guard

## SPECIFICATIONS

|                         |                                                                                |
|-------------------------|--------------------------------------------------------------------------------|
| Crew:                   | 3+6                                                                            |
| Armament:               | 1 x 20mm cannon, 1 x 7.62mm MG (coaxial), 6 x smoke grenade dischargers        |
| Ammunition:             | 1,250 x 20mm, 5,000 x 7.62mm                                                   |
| Length:                 | 6.88m                                                                          |
| Width:                  | 3.24m                                                                          |
| Height over turret top: | 3.015m                                                                         |
| Height hull top:        | 1.9m,                                                                          |
| Ground clearance:       | 0.44m                                                                          |
| Weight, combat:         | 33,500kg                                                                       |
| Weight, empty:          | 29,200kg                                                                       |
| Power-to-weight ratio:  | 18hp/tonne                                                                     |
| Ground pressure:        | 0.83kg/cm <sup>2</sup>                                                         |
| Engine:                 | MTU MB 833 Ea-500 6-cylinder liquid-cooled diesel developing 600hp at 2,200rpm |
| Maximum road speed:     | 75km/hr                                                                        |
| Maximum road range:     | 520km                                                                          |
| Fuel capacity:          | 652 lit                                                                        |
| Fording:                | 1.5m, 2m with preparation                                                      |
| Vertical obstacle:      | 1m                                                                             |
| Trench:                 | 2.5m                                                                           |
| Gradient:               | 60%                                                                            |
| Side slope:             | 30%                                                                            |
| Armour:                 | Classified                                                                     |
| Armour type:            | Steel                                                                          |
| NBC system:             | Yes                                                                            |
| Night vision equipment: | Yes (for commander, gunner and driver) but see text                            |

## DEVELOPMENT

In the 1960s development of an infantry combat vehicle to meet requirements of Germany Army was undertaken by three companies and after trials with three series of prototypes, pre-production vehicles were completed in 1967/68. In 1969 Rhein-stahl was appointed prime contractor for its production vehicle (then known as Marder) with MaK as major sub-contractor.

First production vehicles were delivered to the German Army in December 1970 and production continued until 1975. The chassis remained in production for Roland surface-to-air missile system until 1983. The driver sits front left, with one infantryman behind him, and the engine compartment to his right. Turret is to rear with commander right and gunner left. 20mm cannon and 7.62mm MG mounted externally above turret, powered elevation from -15° to +65°, traverse 360°. Troop compartment rear with three infantrymen seated each side. Vehicle fords to depth of 2m with preparation, and many vehicles have a Euromissile MILAN above commander's hatch on right side of turret.

## VARIANTS

Countless trials versions of Marder 1 but only variant in service is Radarpanzer TUR which is Marder 1 chassis with turret replaced by hydraulically operated arm on which radar scanner is mounted for air defence.

Marder 1 A1(+), double feed for 20mm cannon, image intensification night sight with thermal pointer, new water can racks and flaps for periscopes.

Marder 1 A1(-), as above but prepared for but not fitted with thermal pointer.

Marder 1 A1A, upgraded in all areas except passive night vision equipment.

## TRACKED APCs /WEAPONS CARRIERS

Marder 1 A2, all Marders upgraded to this standard and includes modified chassis and suspension.

Marder 1 A3, all earlier Marders have upgraded to this standard with improved armour and new roof hatch arrangement.

Driving Training Tank, has turret replaced by fixed cupola.

German and Brazilian armies use Marder IFV chassis as basis for their Roland surface-to-air missile system.

Argentina has built an IFV designated VCTP, based on the TAM tank chassis, which is similar to Marder but has simple two-man turret with 20mm cannon.

### STATUS

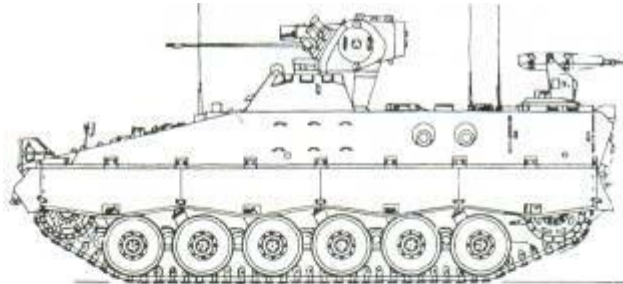
Production complete. In service with German Army only.

### MANUFACTURERS

Henschel Wehrtechnik (previously Rhein Stahl), Kassel and MaK of Kiel, Germany.

*Right:  
Marder 1 IFV*

*Below:  
Marder 1A3  
IFV*



# Henschel Wehrtechnik Jagdpanzer Jaguar 1 SP

## ATGW Vehicle (Germany)

### KEY RECOGNITION FEATURES

- Fighting compartment front with drop-down engine compartment rear, applique armour on front and sides of fighting compartment
- HOT ATGW launcher on left side of fighting compartment roof but can be retracted into vehicle
- Suspension has five road wheels, idler front, drive sprocket rear, return rollers covered by skirts

### SPECIFICATIONS

|                         |                                                                                             |
|-------------------------|---------------------------------------------------------------------------------------------|
| Crew:                   | 4                                                                                           |
| Armament:               | 1 x HOT ATGW launcher, 1 x 7.62mm coaxial MG, 1 x 7.62mm AA MG, 8 smoke grenade dischargers |
| Ammunition:             | 20 HOT ATGW, 3,200 x 7.62mm                                                                 |
| Length:                 | 6.61m                                                                                       |
| Width:                  | 3.12m                                                                                       |
| Height:                 | 2.54m (including missiles), 1.98m (hull top)                                                |
| Ground clearance:       | 0.45m (front), 0.44m (rear)                                                                 |
| Weight, combat:         | 25,500kg                                                                                    |
| Power-to-weight ratio:  | 19.6hp/tonne                                                                                |
| Ground pressure:        | 0.7kg/cm <sup>2</sup>                                                                       |
| Engine:                 | Daimler Benz MB 837 8-cylinder water-cooled diesel developing 800hp at 2,000rpm             |
| Maximum road speed:     | 70km/hr                                                                                     |
| Maximum road range:     | 400km                                                                                       |
| Fuel capacity:          | 470 lit                                                                                     |
| Fording:                | 1.2m                                                                                        |
| Vertical obstacle:      | 0.75m                                                                                       |
| Trench:                 | 2m                                                                                          |
| Gradient:               | 58%                                                                                         |
| Side slope:             | 30%                                                                                         |
| Armour:                 | 50mm max (estimate)                                                                         |
| Armour type:            | Steel                                                                                       |
| NBC system:             | Yes                                                                                         |
| Night vision equipment: | Yes (driver and gunner)                                                                     |

### DEVELOPMENT

During 1967/68 370 Jagdpanzer Raketes were built, 185 by Hanomag and 185 by Henschel. They have the same chassis as 90mm Jagdpanzer Kanone (JPZ 4-5) self-propelled anti-tank gun built earlier by the same companies. The 90mm version is no longer in service with Belgian or German armies.

Between 1978 and 1983 316 of the original 370 Raketes were rebuilt and their SS-11 ATGW system replaced by the more advanced and effective Eurotissile K3S HOT ATGW system with maximum range of 4,000m. At the same time applique armour was added to glacis plate and fighting compartment sides for increased protection against HEAT attack. The rebuilt vehicles are known as Jaguar Is.

Mounted in front right side of hull is 7.62mm MG3 bow machine gun with traverse of 15° left and right and elevation from -8° to +15°. A second 7.62mm MG3 is mounted on commander's cupola for use in anti-aircraft role and a bank of eight electrically operated smoke grenade dischargers is mounted over hull rear firing forwards.

### VARIANTS

Jagdpanzer with HOT Compact Turret and four HOT ATGWs in ready-to-launch position (prototype). Jaguar 2 is Jagdpanzer Kanone with 90mm gun removed, applique armour and roof-mounted TOW ATGW launcher. A total of 162 vehicles were converted to the Jaguar 2 configuration with prime contractor being now Henschel Wehrtechnik, conversions were carried out between 1983 and 1985.



*Above: Jaguar 1 with HOT ATGW launcher extended (Michael Jerchel)*

*Right: Jaguar 2 with TOW launcher in position (Michael Jerchel)*

#### **STATUS**

Production complete. In service with Austria and Germany.

#### **MANUFACTURER**

Original builders were Henschel and Hanomag but conversion was by Thyssen Henschel (now Henschel Wehrtechnik) with Euromissile providing complete HOT ATGW system.



# MaK 1 Wiesel Airportable Armoured Vehicle (Germany)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with engine front left and driver right, TOW ATGW on pedestal mount over open horizontal roof at hull rear
- Suspension each side has three large road wheels, drive sprocket front, large idler and one track-return roller above first and second road wheels
- Hull sides slope inwards to above track guards with air outlet on left side, horizontal louvres with exhaust pipe to immediate rear with gauze-type cover. Right side of hull above tracks has spade

## SPECIFICATIONS (TOW version)

|                         |                                                               |
|-------------------------|---------------------------------------------------------------|
| Crew:                   | 3                                                             |
| Armament:               | 1 x TOW ATGW                                                  |
| Ammunition:             | 7 x TOW ATGW                                                  |
| Length:                 | 3.31m                                                         |
| Width:                  | 1.82m                                                         |
| Height overall:         | 1.897m                                                        |
| Height to hull top:     | 1.352m                                                        |
| Ground clearance:       | 0.302m                                                        |
| Weight, combat:         | 2800kg                                                        |
| Power-to-weight ratio:  | 30.7hp/tonne                                                  |
| Engine:                 | VW 5-cylinder turbocharged diesel developing 86hp at 4,500rpm |
| Maximum road speed:     | 75km/hr                                                       |
| Maximum road range:     | 300km                                                         |
| Fuel capacity:          | 80 lit                                                        |
| Vertical obstacle:      | 0.4m                                                          |
| Trench:                 | 1.2m                                                          |
| Gradient:               | 60%                                                           |
| Side slope:             | 30%                                                           |
| Armour:                 | Classified                                                    |
| Armour type:            | Steel                                                         |
| NBC system:             | None                                                          |
| Night vision equipment: | Optional                                                      |

## DEVELOPMENT

The Wiesel airportable light armoured vehicle was developed for German airborne units by Porsche but production is undertaken by MaK with the first of 345 vehicles being delivered to the German Army late in 1989. The order was 210 with TOW ATGW and 135 with 20mm cannon. Wiesel with TOW, designated TOW A1 by German Army, has Raytheon Systems Company TOW

ATGW launcher in rear with traverse of 45° left and right and total of seven missiles. The other version selected by the German Army is MK 20 A1 with two-man crew and KUKA turret armed with Rheinmetall 20mm MK 20 Rh 202 cannon with traverse of 110° left and right. It has 160 rounds of ready-use ammunition.

## VARIANTS

The Wiesel 1 is suitable for a wide range of other roles including command and control vehicle, battlefield surveillance vehicle with radar, fitted with Euromissile HCT turret with HOT ATGWs, reconnaissance vehicle with SAMM BTM 208 turret, resupply vehicle, recovery vehicle, ambulance, air defence with Bofors RBS-70 SAM, and armoured personnel carrier.

The United States Army has taken delivery of a small number of vehicles for use in extensive Robotic trials.

Wiesel 2: Further development by MaK as a private venture resulted in the Wiesel 2, or Extended Base Vehicle as it has also been referred to. There is a separate entry for the Wiesel 2 in this section. Wiesel 2 is already in production and service with the German Army.

## STATUS

Production complete. In service with the German Army.

## MANUFACTURER

MaK, Kiel, Germany.

## TRACKED APCs /WEAPONS CARRIERS



*Above: Wiesel with  
BTM 208 turret  
(Michael Jerchel)*



*Left: Wiesel with  
TOW (TOW A1)*



*Above right: Wiesel  
with 20mm cannon  
(MK20A1)*

*Right: Wiesel with  
TOW (TOW A1)  
(Christopher Foss)*



# Boragh Armoured Personnel Carrier (Iran)

## KEY RECOGNITION FEATURES

- Pointed nose with almost horizontal ribbed glacis plate, driver front left, engine compartment louvres in roof to right, weapon in centre of roof and troop compartment at rear with two roof hatches, one each side. Vertical hull rear with two bulged doors opening to the rear

- Mounted on the roof is a 12.7mm machine gun with no protection for the gunner although recent production versions have a horseshoe type armour system for the gunner. Firing ports are provided in hull sides and rear

- Suspension each side has six road wheels, drive sprocket at front, idler at rear and track return rollers. Upper part of suspension is covered by a rubber skirt

## SPECIFICATIONS

|                         |                                                                  |
|-------------------------|------------------------------------------------------------------|
| Crew:                   | 2 + 8                                                            |
| Armament:               | 1 x 12.7mm machine gun                                           |
| Ammunition:             | 1000 x 12.7mm                                                    |
| Length hull:            | 6.72m                                                            |
| Width:                  | 3.10m                                                            |
| Height:                 | 1.6m (hull top)                                                  |
| Ground clearance:       | 0.40m                                                            |
| Weight, combat:         | 13,000kg                                                         |
| Weight, empty:          | 12,000kg (estimate)                                              |
| Power-to-weight ratio:  | 25.4hp/tonne                                                     |
| Ground pressure:        | 0.55kg/cm                                                        |
| Engine:                 | V-8 air-cooled turbocharged diesel developing 330 hp at 2,300rpm |
| Maximum road speed:     | 65km/h                                                           |
| Maximum road range:     | 625km                                                            |
| Fuel capacity:          | 800litres                                                        |
| Fording:                | Amphibious with preparation                                      |
| Vertical obstacle:      | 0.70 m                                                           |
| Trench:                 | 2.30m                                                            |
| Gradient:               | 60%                                                              |
| Side slope:             | 40%                                                              |
| Armour:                 | 18mm (max estimate)                                              |
| Armour type:            | Steel                                                            |
| NBC system:             | Probable                                                         |
| Night vision equipment: | Probable                                                         |

## DEVELOPMENT

The hull of the Boragh armoured personnel carrier is similar in many respects to that of the Russian BMP-2 and its Chinese equivalent the WZ 501 infantry fighting vehicles. The main difference is that the Boragh as currently fielded has a simple

12.7mm machine gun cupola and its road wheels are similar to those of the US United Defense M113 series APC which is used in large numbers by Iran.

The driver is seated at the front of the vehicle on the left side with the power pack to his right. The commander/machine gunner is seated in the centre of the hull with the troop compartment at the rear. The troops are seated down the centre of the vehicle facing outwards and enter the vehicle via two doors in the hull rear. Firing ports and associated vision devices allow the troops to fire their weapons from within the hull.

The Boragh is fully amphibious with the minimum of preparation, being propelled in the water by its tracks. Before entering the water a trim vane is erected at the front of the hull and the bilge pumps are switched on.

The vehicle can lay its own smoke screen by injecting diesel fuel into the exhaust outlet at the front of the hull on the right side.

## VARIANTS

No variants of the Boragh have been revealed although it is probable that other versions are under development such as command post vehicle and weapons carrier.

## STATUS

Production. In service with Iran.

## MANUFACTURER

Defence Industries Organisation, Shahid Kolahdooz Industrial Complex, Iran

*Right: Boragh APC armed with 12.7mm MG*





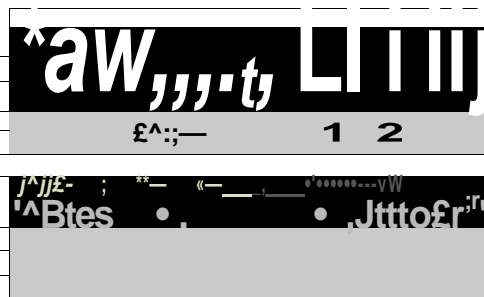
# OTOBREDA Infantry Armoured Fighting Vehicle (Italy)

## KEY RECOGNITION FEATURES

- Based on modified M113 hull with well-sloped glacis plate with trim vane, horizontal hull top, hull sides vertical but slope inwards at rear, two firing ports each with observation window above
- Cupola right with external 12.7mm MG, 7.62mm MG on ring mount rear. Hull ramp at rear between two external fuel tanks
- Suspension each side has five road wheels, drive sprocket front, idler rear, no track-return rollers, upper part of track covered by rubber skirt

## SPECIFICATIONS

|                                |                                                                                               |
|--------------------------------|-----------------------------------------------------------------------------------------------|
| Crew:                          | 2+7                                                                                           |
| Armament:                      | 1 x 12.7mm MG, 1 x 7.62mm MG                                                                  |
| Ammunition:                    | 1,050 x 12.7mm, 1,000 x 7.62mm                                                                |
| Length:                        | 5.041m                                                                                        |
| Width:                         | 2.686m                                                                                        |
| Height over MG:                | 2.552m                                                                                        |
| Height over commander's cover: | 2.032m                                                                                        |
| Hull to hull top:              | 1.828m                                                                                        |
| Ground clearance:              | 0.406m                                                                                        |
| Weight, combat:                | 11,600kg                                                                                      |
| Power-to-weight ratio:         | 18.53bhp/tonne                                                                                |
| Ground pressure:               | 0.57kg/cm <sup>2</sup>                                                                        |
| Engine:                        | Detroit Diesel Model 6V-53<br>6-cylinder water-cooled diesel<br>developing 215bhp at 2,800rpm |
| Maximum road speed:            | 64.4km/hr                                                                                     |
| Maximum water speed:           | 5km/hr                                                                                        |
| Maximum road range:            | 550km                                                                                         |
| Fuel capacity:                 | 360 lit                                                                                       |
| Fording:                       | Amphibious                                                                                    |
| Vertical obstacle:             | 0.61m                                                                                         |
| Trench:                        | 1.88m                                                                                         |
| Gradient:                      | 600c                                                                                          |
| Side slope:                    | 30%                                                                                           |
| Armour:                        | Classified                                                                                    |
| Armour type:                   | Aluminium with layer of steel                                                                 |
| NBC system:                    | None                                                                                          |
| Night vision equipment:        | Yes (infra-red for driver)                                                                    |



## DEVELOPMENT

Infantry Armoured Fighting Vehicle was developed by Automotive Technical Service of Italian Army and is based on US M113A1, made under licence by OTOBREDA. Main improvements over M113A1 are increased firepower, improved armour protection (standard aluminium armour plus layer of steel armour added to hull front, sides and rear), improved seating arrangements, ability for some troops to aim and fire from inside the vehicle using firing ports and vision blocks. Infantry Armoured Fighting Vehicle is also referred to as VCC-1 by Italian Army. Final deliveries made in 1982.

Engine compartment is front right, 12.7mm MG gunner to rear. Driver sits front left with vehicle commander rear. Infantry compartment is rear of hull, infantry enter and leave via power operated ramp. Over top of troop compartment is ring-mounted 7.62mm MG. For operations in Somalia, some vehicles were fitted with Enhanced Appliance Armour Kit (EAAK). IAFV is fully amphibious, propelled by its tracks. Before entering water a trim vane is erected at front of vehicle and bilge pumps switched on.

*Left: IAFV without armament and fitted with applique armour (Richard Stickland)*

*Right: IAFV from rear with all hatches open and fitted with applique armour (Richard Stickland)*

### VARIANTS

Saudi Arabia has taken delivery of 224 IAFVs with US Improved TOW system as fitted to M901 Improved TOW Vehicle.

Italian Army also uses large numbers of M113/M113A1S, some of which have applique armour and firing ports/vision blocks in rear troop compartment (known as VCC-2s). Italian Army has also used M113A1 as basis for SIDAM 4x25mm self-propelled anti-aircraft gun system.

### STATUS

Production complete but can be resumed for further orders. In service with Italy and Saudi Arabia.

### MANUFACTURER

OTOBREDA, La Spezia, Italy.



# Dardo IFV (Italy)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver's circular hatch in upper left side, horizontal roof, turret centre. Troop compartment rear with a single roof hatch above that opens to the rear
- Hull sides above tracks slope inwards, large horizontal air louvres on forward right side of hull, two spherical firing ports with vision block above in each side of troop compartment, hull rear slopes inwards with integral power-operated ramp
- Turret sides slope inwards with commander's cupola on left, periscopic sight to his immediate front. Suspension each side has six road wheels, drive sprocket front, idler rear, three track-return rollers. Upper part covered by side skirts

## SPECIFICATIONS

|                         |                                                                                                |
|-------------------------|------------------------------------------------------------------------------------------------|
| Crew:                   | 2+7                                                                                            |
| Armament:               | 1 x 25mm cannon, 1 x 7.62mm MG (co-axial), 2 x TOW launchers and 2 x 3 smoke grenade launchers |
| Ammunition:             | 200 x 20mm (ready use), 700 x 7.62mm (ready use), 2 x TOW ATGW (ready use).                    |
| Length:                 | 6.705m                                                                                         |
| Width:                  | 3.00m                                                                                          |
| Height overall:         | 2.64m                                                                                          |
| Ground clearance:       | 0.4m                                                                                           |
| Weight, loaded:         | 23,000kg                                                                                       |
| Weight, empty:          | 21,500kg                                                                                       |
| Power-to-weight ratio:  | 22.6hp/tonne                                                                                   |
| Engine:                 | IVECO 8260 V-6 turbocharged, intercooled diesel developing 520bhp at 2,300rpm                  |
| Maximum road speed:     | 70km/hr                                                                                        |
| Maximum cruising range: | 500km                                                                                          |
| Fuel capacity:          | Not available                                                                                  |
| Fording:                | 1.5m                                                                                           |
| Vertical obstacle:      | 0.85m                                                                                          |
| Trench:                 | 2.5m                                                                                           |
| Gradient:               | 60°/o                                                                                          |
| Side slope:             | 40%                                                                                            |
| Armour:                 | Classified                                                                                     |
| Armour type:            | Aluminium/steel                                                                                |
| NBC system:             | Yes                                                                                            |
| Night vision equipment: | Yes (passive for commander, gunner and driver)                                                 |

## DEVELOPMENT

The Dardo IFV, previously called the VCC-80 IV, has been developed by Consorzio Iveco Oto to meet the requirements of the Italian Army with first production contract being placed late in 1998 for the delivery of 200 vehicles. Hull is all aluminium armour with additional layer of steel for increased protection. Driver sits front left with powerpack to his right, two-man power-operated turret is centre and troop compartment rear. In action the vehicle commander would dismount with the six infantrymen, five of whom can aim and fire from inside the vehicle using two firing ports/vision blocks in each side of hull and one in rear ramp. Commander sits on turret left, gunner right. 25mm Oerlikon Contraves KBA cannon power-elevates from -10° to +60° and is stabilised, turret traverses 360°. 7.62mm MG is mounted coaxial to left of 25mm cannon. Fire-control system includes laser rangefinder and thermal image night vision equipment.

## VARIANTS

Anti-tank with TOW missile launcher either side of turret  
120mm mortar carrier  
Command post vehicle  
Ambulance  
Fitted with T60/T70 turret system

## STATUS

Entering production for Italian Army.

## MANUFACTURER

Consorzio Iveco Oto

## TRACKED APCs /WEAPONS CARRIERS



*Above left: ITV with TOW  
Left: IFV with TOW*

*Above: IFV with TOW*



# Mitsubishi Heavy Industries Type 89

## Mechanised Infantry Combat Vehicle (Japan)

### KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver front right, turret centre, troop compartment rear with two-part roof hatch opening left and right and three firing ports in each side
- Turret has vertical sides with ATGW mounted externally each side, 35mm cannon in forward part of turret with night sight right
- Suspension each side has six road wheels, drive sprocket front, idler rear, three track-return rollers, skirts

### SPECIFICATIONS

|                         |                                                                                    |
|-------------------------|------------------------------------------------------------------------------------|
| Crew:                   | 3+7                                                                                |
| Armament:               | 1 x 35mm, 1 x 7.62mm MG (coaxial),<br>2 x ATGW, 2 x 3 smoke grenade<br>dischargers |
| Length:                 | 6.7m                                                                               |
| Width:                  | 3.2m                                                                               |
| Height:                 | 2.50m                                                                              |
| Ground clearance:       | 0.45m                                                                              |
| Weight, combat:         | 27,000kg                                                                           |
| Power-to-weight ratio:  | 22.22hp/tonne                                                                      |
| Ground pressure:        | 0.73kg/cm <sup>2</sup>                                                             |
| Engine:                 | Diesel developing 600hp                                                            |
| Maximum road speed:     | 70km/hr (forwards),<br>42km/hr (reverse)                                           |
| Maximum road range:     | 400km                                                                              |
| Fuel capacity:          | Not available                                                                      |
| Fording:                | 1m                                                                                 |
| Vertical obstacle:      | 0.8m                                                                               |
| Trench:                 | 2.4m                                                                               |
| Gradient:               | 60%                                                                                |
| Side slope:             | 30°                                                                                |
| Armour:                 | Classified                                                                         |
| Armour type:            | Steel                                                                              |
| NBC system:             | Yes                                                                                |
| Night vision equipment: | Yes                                                                                |

### DEVELOPMENT

Development of a new mechanised infantry combat vehicle

started in 1984 and after trials it was classified as the Type 89 with first production vehicles being completed in 1991. Prime contractor is Mitsubishi Heavy Industries with Komatsu being major sub-contractor. The layout of the vehicle is conventional with the driver being seated at the front right with the powerpack to his left, two-man power-operated turret in the centre and the troop compartment at the rear which is provided with entry doors, roof hatches and firing ports.

The commander is seated on the right side of the turret with the gunner on the left with both crew members being provided with a single piece roof hatch, periscopes for observation and a sight for aiming main armament. Main armament consists of a 35mm Oerlikon Contraves cannon with a 7.62mm machine gun mounted coaxial and a Jyu-MAT medium range wire-guided anti-tank missile being mounted either side of the turret. Once these have been launched new missiles have to be reloaded manually.

### VARIANTS

As far as it is known there are no variants of the Type 89 MICV although the vehicle can be fitted with mine clearing equipment at the front of the hull.

### STATUS

In production. In service with the Japanese Ground Self Defence Force.

### MANUFACTURER

Mitsubishi Heavy Industries, Tokyo, Japan.



## TRACKED APCs /WEAPONS CARRIERS

*Main picture: Type 89  
MICV (Paul Beaver)*

*Inset: Type 89 MICV  
(Kensuke Ebata)*





# Mitsubishi Heavy Industries Type 73 APC (Japan)

## KEY RECOGNITION FEATURES

- Low profile hull with glacis plate at 45°, horizontal hull top, vertical rear with two doors, vertical hull sides
- Flotation screen on glacis plate, 7.62mm MG in left side of glacis plate, 12.7mm MG on raised cupola on right side of hull top, 2x3 smoke grenade dischargers at hull rear above twin doors
- Suspension each side has five road wheels, drive sprocket front, idler rear, no return rollers or skirt

## SPECIFICATIONS

|                         |                                                                           |
|-------------------------|---------------------------------------------------------------------------|
| Crew:                   | 3+9                                                                       |
| Armament:               | 1 x 12.7mm MG (main), 1 x 7.62mm MG (bow), 2x3 smoke grenade dischargers  |
| Length:                 | 5.8m                                                                      |
| Width:                  | 2.8m                                                                      |
| Height including MG:    | 2.2m                                                                      |
| Height, hull top:       | 1.7m                                                                      |
| Ground clearance:       | 0.4m                                                                      |
| Weight, combat:         | 13,300kg                                                                  |
| Power-to-weight ratio:  | 22.6hp/tonne                                                              |
| Engine:                 | Mitsubishi 4ZF air-cooled 2-stroke V4 diesel developing 300hp at 2,200rpm |
| Maximum road speed:     | 70km/hr                                                                   |
| Maximum water speed:    | 7km/hr                                                                    |
| Maximum road range:     | 300km                                                                     |
| Fuel capacity:          | 450 lit                                                                   |
| Fording:                | Amphibious (with kit)                                                     |
| Vertical obstacle:      | 0.7m                                                                      |
| Trench:                 | 2m                                                                        |
| Gradient:               | 60%                                                                       |
| Side slope:             | 30%                                                                       |
| Armour:                 | Classified                                                                |
| Armour type:            | Aluminium                                                                 |
| NBC system:             | Yes                                                                       |
| Night vision equipment: | Yes (infra-red for driver)                                                |

## DEVELOPMENT

Development of a new APC to succeed Type SU 60 in Japanese Ground Self Defence Force commenced in 1967. After extensive

trials with competing designs, Mitsubishi vehicle was accepted for service as Type 73 APC with first production vehicles completed in 1974. Production was completed after 225 had been built. It was followed by the Type 89 mechanised infantry combat vehicle (qv).

Bow 7.62mm MG gunner sits front left with driver front right and vehicle commander slightly to right and rear of bow MG gunner. Engine compartment to rear of driver with 12.7mm MG cupola on right side of hull roof. 12.7mm MG can be aimed and fired from inside vehicle, elevation from -10° to +60°, turret traverse 360°. Roof hatches over troop compartment and six T-shaped firing ports, two in each side of hull and two in rear, allowing some troops to fire from inside.

The Type 73 is fully amphibious with the aid of a kit which includes trim vane on glacis plate, buoyancy aids for wheels, skirts over tracks and protection for air inlet and air outlet louvres on roof.

## VARIANTS

Only variant in service is command post vehicle with higher roof at rear. Automotive components of Type 73 are used in Type 75 self-propelled ground wind-measuring system and used with Type 75 130mm self-propelled rocket launcher. Components of the Type 73 APC are also used in a new Japanese mineclearing vehicle.

## STATUS

Production complete. In service with Japanese Ground Self Defence Force only.

## MANUFACTURER

Mitsubishi Heavy Industries, Tokyo, Japan.

## TRACKED APCs /WEAPONS CARRIERS



*Above. Type 73 ARC (Kensuke Ebata)*



*Left: Type 73 APC*

# Mitsubishi Heavy Industries Type SU 60 APC (Japan)

## KEY RECOGNITION FEATURES

- Glacis plate at about 60° with 7.62mm MG ball mounted on left side, horizontal roof, engine compartment on left side to rear of bow MG operator and commander, troop compartment rear with roof hatches opening left and right
- Vertical hull sides and rear, twin doors in rear open outwards
- Suspension has five road wheels, drive sprocket front, idler rear, three track-return rollers, no skirts

## SPECIFICATIONS

|                             |                                                                                               |
|-----------------------------|-----------------------------------------------------------------------------------------------|
| Crew:                       | 4+6                                                                                           |
| Armament:                   | 1 x 12.7mm MG,<br>1 x 7.62mm MG (bow)                                                         |
| Length:                     | 4.85m                                                                                         |
| Width:                      | 2.4m                                                                                          |
| Height including 12.7mm MG: | 2.31m                                                                                         |
| Height hull top:            | 1.7m                                                                                          |
| Ground clearance:           | 0.4m                                                                                          |
| Weight, combat:             | 11,800kg                                                                                      |
| Weight, empty:              | 10,600kg                                                                                      |
| Power-to-weight ratio:      | 18.64hp/tonne                                                                                 |
| Engine:                     | Mitsubishi Model 8 HA 21 WT,<br>V-8 air-cooled 4-cycle diesel<br>developing 220hp at 2,400rpm |
| Maximum road speed:         | 45km/hr                                                                                       |
| Maximum road range:         | 300km                                                                                         |
| Fuel capacity:              | Not available                                                                                 |
| Fording:                    | 1m                                                                                            |
| Vertical obstacle:          | 0.6m                                                                                          |
| Trench:                     | 1.82m                                                                                         |
| Gradient:                   | 60%                                                                                           |
| Side slope:                 | 30%                                                                                           |
| Armour:                     | Classified                                                                                    |
| Armour type:                | Steel                                                                                         |
| NBC system:                 | None                                                                                          |
| Night vision equipment:     | None                                                                                          |

## DEVELOPMENT

In the mid-1950s Japanese Ground Self Defence Force issued a requirement for a full tracked APC and after trials with various prototypes one was accepted for service as Type SU 60. Production subsequently undertaken by Komatsu and Mitsubishi from 1959 through to the early 1970s, an estimated 430 being built. As its successor, Type 73 has been built in smaller numbers. Type SU 60 will remain in service in declining numbers until well into the next decade.

Driver sits front right with bow machine gunner on left side, vehicle commander between them, 12.7mm M2 HB MG complete with shield on right side of roof to rear of commander. Troop compartment at hull rear with twin doors rear and roof hatches above. No provision for weapon-firing from inside.

## VARIANTS

Type SX 60 81mm mortar carrier has 81mm mortar mounted in hull rear which can also be deployed away from vehicle. Only 18 built.

Type SX 60 4.2 inch (107mm) mortar carrier has 107mm (4.2 inch) mortar mounted in rear which can also be deployed away from vehicle. Only 18 built. 107mm mortar carrier can be distinguished from 81mm version by distinct chamfer to top of hull rear.

SU 60 dozer, only two in service, front-mounted dozer blade.

NBC detection vehicle has device at rear for taking soil samples.

Anti-tank vehicle, a few Type SU 60s have been fitted with two KAM-3D anti-tank guided missiles on hull roof at rear.

For training, a few SU 60s have been modified to resemble Russian BMD 1 airborne combat vehicles.



*Above: Type SX BO 4.2 inch  
(107mm) mortar carrier*

*Right: Type SU 60 APC*



#### **STATUS**

Production complete. In service with Japanese Ground Self Defence Force only.

#### **MANUFACTURER**

Mitsubishi Heavy Industries, Tokyo;  
Komatsu Manufacturing Corporation,  
Japan

# Komatsu Type 60 106mm SP Recoilless Gun (Japan)

## KEY RECOGNITION FEATURES

- Low profile hull with two 106mm recoilless rifles in right side with travelling lock on hull front
- Suspension has five road wheels, drive sprocket front, idler rear, three track-return rollers

## SPECIFICATIONS

|                         |                                                                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Crew:                   | 3                                                                                                                                       |
| Armament:               | 2 x 106mm recoilless rifles,<br>1 x 12.7mm MG                                                                                           |
| Ammunition:             | 8 x 106mm                                                                                                                               |
| Length:                 | 4.3m                                                                                                                                    |
| Width:                  | 2.23m                                                                                                                                   |
| Height:                 | 1.59m                                                                                                                                   |
| Ground clearance:       | 0.35m                                                                                                                                   |
| Weight, combat:         | 8,000kg                                                                                                                                 |
| Weight, empty:          | 7,600ky                                                                                                                                 |
| Power-to-weight ratio:  | 18hp/tonne (150hp engine)                                                                                                               |
| Ground pressure:        | 0.67kg/cm <sup>2</sup>                                                                                                                  |
| Engine:                 | Komatsu Model 6T 120-2 air-cooled,<br>6-cylinder diesel developing 120hp<br>at 2,400rpm (late production<br>vehicles have 150hp engine) |
| Maximum road speed:     | 45km/hr (early production model),<br>55km/hr (late production model)                                                                    |
| Maximum road range:     | 250+km                                                                                                                                  |
| Fuel capacity:          | 140 lit                                                                                                                                 |
| Fording:                | 0.7m                                                                                                                                    |
| Vertical obstacle:      | 0.60m                                                                                                                                   |
| Trench:                 | 1.8m                                                                                                                                    |
| Gradient:               | 60%                                                                                                                                     |
| Side slope:             | 30%                                                                                                                                     |
| Armour:                 | 12mm max (estimate)                                                                                                                     |
| Armour type:            | Steel                                                                                                                                   |
| NBC system:             | No                                                                                                                                      |
| Night vision equipment: | IR night sight (optional)                                                                                                               |

## DEVELOPMENT

Type 60 106mm was developed from the 1950s to meet requirements of Japanese Ground Self Defence Force with production under way in 1960. Three versions were built, the final Model C having more powerful engine. Production completed in 1979 after 223 had been built.

Main armament comprises two 106mm recoilless rifles in right side of hull with traverse of 10 degrees left and right and elevation from -5 to +10. The two rifles and mount can be raised with the aid of powered controls above roof of vehicle, when they have traverse of 30 degrees left and right, elevation from -20 to +15. Mounted over right recoilless rifle is 12.7mm ranging machine gun. The effectiveness of these 106mm recoilless rifles against the more modern armours is questionable. For improved mobility in snow extra wide tracks can be fitted.

The recoilless rifles fire fixed HEAT and HE ammunition. A rangefinder is carried on the vehicle and some vehicles have been fitted with infra-red night vision equipment.

## VARIANTS

No variants.

## STATUS

Production complete. In service with Japanese Ground Self Defence Force only.

## MANUFACTURER

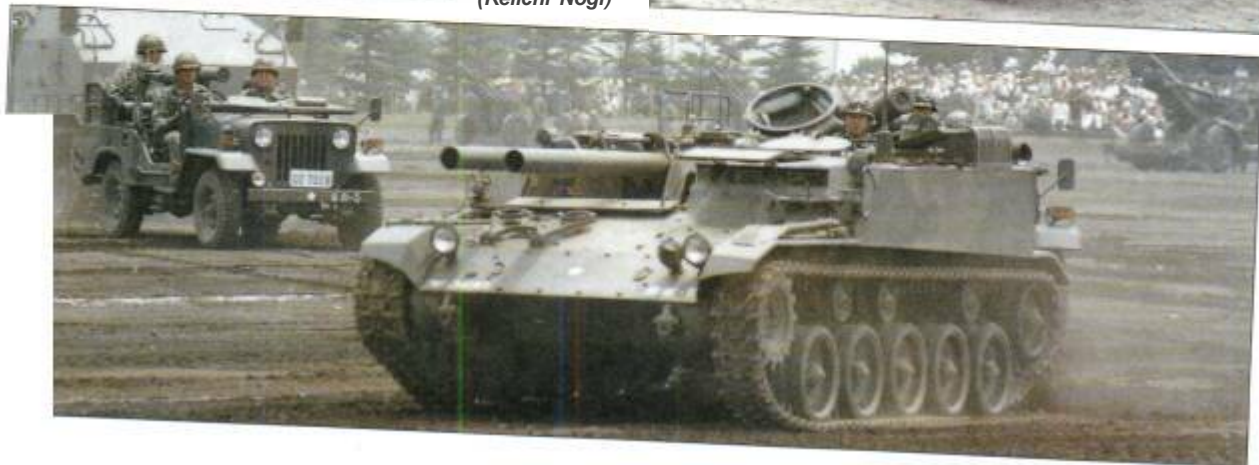
Komatsu Seisakujyo, Tokyo, Japan.



*Right: Type 60  
106mm*

*Left: Type 60  
106mm from  
rear with  
weapons  
lowered  
(Kensuke  
Ebata)*

*Below: Type  
60 106mm  
with weapons  
lowered  
(Keiichi Nogi)*



# MLVM Mountaineers Combat Vehicle (Romania)

## KEY RECOGNITION FEATURES

- Large box type hull with well sloped glacis plate, nose slopes back under front of vehicle, hull sides slope slightly inwards with chamfer either side of hull at front, vertical hull rear with two doors
- Suspension either side consists of six spoked road wheels, drive sprocket at front, idler at rear and three track-return rollers, upper part of track covered by shallow skirt
- Turret in centre of hull roof with flat top and conical sides, distinctive sight is on left of turret and is protected by a distinctive wire cage

## SPECIFICATIONS

|                         |                                               |
|-------------------------|-----------------------------------------------|
| Crew:                   | 2+7                                           |
| Armament:               | 1 x 14.5mm MG, 1 x 7.62mm MG (coaxial)        |
| Ammunition:             | 600 x 14.5mm, 2,500 x 7.62mm                  |
| Length:                 | 5.85m                                         |
| Width:                  | 2.714m                                        |
| Height:                 | 1.95m (turret roof), 1.55m (hull top)         |
| Ground clearance:       | 0.38m                                         |
| Weight, combat:         | 9,000kg                                       |
| Power-to-weight ratio:  | 17.11hp/tonne                                 |
| Ground pressure:        | 0.47kg/cm <sup>2</sup>                        |
| Engine:                 | 4-stroke supercharged diesel developing 153hp |
| Maximum road speed:     | 48km/hr                                       |
| Range:                  | 370/440km (cross-country), 680/740km (road)   |
| Fuel capacity:          | 480 lit                                       |
| Fording:                | 0.6m                                          |
| Vertical obstacle:      | 0.6m                                          |
| Trench:                 | 1.5m                                          |
| Gradient:               | 60%                                           |
| Side slope:             | 300/0                                         |
| Armour:                 | Classified                                    |
| Armour type:            | Steel                                         |
| NBC system:             | Yes                                           |
| Night vision equipment: | Yes (infra-red)                               |

## DEVELOPMENT

The MLVM Mountaineers Combat Vehicle was developed to meet the specific operational requirements of the Romanian Army for a vehicle capable of operating in mountainous terrain. The driver is seated at the front left with the vehicle commander to his rear and the powerpack to their right. The troop compartment is at the rear with the troops entering via two doors in the hull rear. The troop compartment is provided with firing ports and vision devices and each of the rear doors contains an integral fuel tank.

## VARIANTS

MLVM AR, this has a modified rear hull and is fitted with a 120mm mortar.

ABAL armoured vehicle for combat supply.

Ambulance, this is similar to the ABAL armoured vehicle for combat supply

## STATUS

Production as required. In service with Romania.

## MANUFACTURER

RATMILSA

*Right: MLVM Mountaineers Combat Vehicle  
(Paul Beaver)*





# MT-LB Multi-Purpose Tracked Vehicle (Russia)

## KEY RECOGNITION FEATURES

- Commander's and driver's compartment to immediate rear of glacis plate, small flat-topped turret right of driver
- Troop compartment extends from crew compartment to rear of vehicle, almost vertical sides with chamfered top, twin rear doors, single firing port in left hull side
- Six equally spaced ribbed road wheels, drive sprocket front, idler rear, no track-return rollers

## SPECIFICATIONS

|                         |                                                     |
|-------------------------|-----------------------------------------------------|
| Crew:                   | 2+11                                                |
| Armament:               | 1 x 7.62mm MG                                       |
| Ammunition:             | 2,500 x 7.62mm                                      |
| Length:                 | 6.45m                                               |
| Width:                  | 2.86m                                               |
| Height:                 | 1.865m                                              |
| Ground clearance:       | 0.4m                                                |
| Weight, combat:         | 11,900kg                                            |
| Weight, empty:          | 9,700kg                                             |
| Power-to-weight ratio:  | 20.16hp/tonne                                       |
| Ground pressure:        | 0.46kg/cm <sup>2</sup>                              |
| Engine:                 | YaMZ 238 V, V-8 diesel developing 240hp at 2,100rpm |
| Maximum road speed:     | 61.5km/hr                                           |
| Maximum water speed:    | 5-6km/hr                                            |
| Maximum road range:     | 500km                                               |
| Fuel capacity:          | 450 lit                                             |
| Fording:                | Amphibious                                          |
| Vertical obstacle:      | 0.61m                                               |
| Trench:                 | 2.41m                                               |
| Gradient:               | 60%                                                 |
| Side slope:             | 30%                                                 |
| Armour:                 | 3-10mm                                              |
| Armour type:            | Steel                                               |
| NBC system:             | Yes                                                 |
| Night vision equipment: | Yes (infra-red for commander and driver)            |

## DEVELOPMENT

The MT-LB was developed in the late 1960s to replace the AT-P armoured tracked artillery tractor which is no longer in front-

line service. It is based on MT-L unarmoured tracked amphibious carrier. Typical roles include carrying 11 fully equipped troops, towing 122mm D-30 howitzers or 100mm T-12 anti-tank guns, command and radio vehicle, artillery fire-control vehicle and cargo carrier, and many specialised versions.

The vehicle is fully amphibious, propelled by its tracks. Basic version normally has 350mm wide tracks which give ground pressure of 0.46kg/cm<sup>2</sup>, but these can be replaced by much wider 565mm tracks which lower ground pressure to 0.27/0.28kg/cm<sup>2</sup>, giving vehicle improved mobility in snow or swamp. Turret is manned by commander and has single 7.62mm PKT MG with manual elevation from -5 degrees to +30 degrees and manual traverse through 360 degrees. No roof hatch.

## VARIANTS

MT-LBV is standard MT-LB with 565mm wide tracks.

MT-LB artillery tractor normally has fully enclosed box over troop compartment for gun equipment.

MY-LBU command has additional radios, generator, land navigation system and canvas cover that extends to rear for additional space.

MT-LB with Big Fred artillery/mortar locating radar mounted on roof; when travelling antenna folds forward. Russian designation is TT-LB.

MTP-LB repair vehicle has no turret, A-frame, stowage on vehicle roof, winch, tools and other specialised equipment.

MT-LB ambulance has stretchers in rear troop compartment.

MT-LB engineer vehicle has stowage box on roof and hydraulically operated blade at hull rear.

SA-13 Gopher SAM system is based on MT-LB chassis.

MT-LB with AT-6 ATGW, has launcher which is raised when required.

MT-LBs are used for a variety of artillery and air defence fire control vehicles.

RKhM chemical reconnaissance vehicle is based on MT-LB components.

There are numerous Polish variants of MT-LB.

There are numerous Bulgarian variants of MT-LB.

MT-LB mortar, includes 82mm Vasilek and 120mm.

MT-LB with WAT turret, used by Poland, has turret of OT-64C (2) (SKOT-2AP) turret.

MT-LB, Iraq, includes 120mm mortar in rear and another with four 120mm mortars mounted externally at rear.

### STATUS

Production complete. In service with Armenia, Azerbaijan, Bangladesh, Belarus, Bulgaria, Finland, Hungary, Iraq, Kazakhstan, Moldova, Russia, Sweden, Ukraine and Yugoslavia.

### MANUFACTURER

Kharkov Tractor Plant, also made in Bulgaria and Poland.

*Right: MT-LB with Big Fred (SNAR-10) radar*



*Below: MT-LB towing 100mm T-12 anti-tank gun*



# BMP-3 Infantry Combat Vehicle (Russia)

## KEY RECOGNITION FEATURES

- Large box type hull with almost horizontal glacis plate, nose slopes back under front of hull, vertical hull sides rear v. ith two small doors in hull rear. Mounted in either side of hull front is a 7.62mm MG firing forwards
- Circular turret in centre of hull with two hatches, over frontal 180° of the turret is another layer of armour, long-barrelled 100mm gun with 30mm cannon mounted coaxial to right, distinctive box over rear of main armament
- Suspension either side has six road wheels with idler at front, drive sprocket at rear and three track-return rollers, upper part of track covered by light steel cover similar to that on BMP-1 and BMP-2.

## SPECIFICATIONS

|                         |                                                                                                                                          |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Crew:                   | 3+7                                                                                                                                      |
| Armament:               | 1 x 100mm, 1 x 30mm cannon (coaxial), 1 x 7.62mm MG (coaxial), 2 x 7.62mm (hull front, one either side), 2 x 3 smoke grenade dischargers |
| Ammunition:             | 40 x 100mm, 500 x 30mm, 6,000 x 7.62mm, 6 x ATGW                                                                                         |
| Length:                 | 7.14m                                                                                                                                    |
| Width:                  | 3.15m                                                                                                                                    |
| Height:                 | 2.30m (turret roof)                                                                                                                      |
| Ground clearance:       | 510mm (see text)                                                                                                                         |
| Weight, combat:         | 18,700kg                                                                                                                                 |
| Power-to-weight ratio:  | 26.73hp/tonne                                                                                                                            |
| Ground pressure:        | 0.61 kg/cm <sup>2</sup>                                                                                                                  |
| Engine:                 | Diesel developing 500hp                                                                                                                  |
| Maximum road speed:     | 70km/hr                                                                                                                                  |
| Maximum water speed:    | 10km/hr                                                                                                                                  |
| Maximum road range:     | 600km                                                                                                                                    |
| Fuel capacity:          | Not known                                                                                                                                |
| Fording:                | Amphibious                                                                                                                               |
| Vertical obstacle:      | 0.8m                                                                                                                                     |
| Trench:                 | 2.5m                                                                                                                                     |
| Gradient:               | 60%                                                                                                                                      |
| Side slope:             | 30%                                                                                                                                      |
| Armour:                 | Classified                                                                                                                               |
| Armour type:            | Steel                                                                                                                                    |
| NBC system:             | Yes                                                                                                                                      |
| Night vision equipment: | Yes (commander, gunner and driver)                                                                                                       |

## DEVELOPMENT

The BMP-3 was developed to meet the requirements of the Russian Army and was first seen in public during a parade held in Moscow in 1990.

The driver is seated at the front of the vehicle in centre with an additional crew member to his left and right, all three being provided with a single piece hatch cover. The two man turret is in the centre of the hull with the commander being seated on the right and the gunner on the left, both with a roof hatch. Main armament consists of a 100mm rifled gun that in addition to firing conventional ammunition also fires a laser guided ATGW which has the NATO designation of the AT-10. Mounted to the right of this is a 30mm cannon that is attached to the 100mm gun. In addition there is a 7.62mm machine gun mounted to the right of the 30mm cannon with another 7.62mm machine gun being mounted in the front of the hull firing forwards. A total of seven infantrymen are carried, one either side of the driver with the remainder being seated to the sides and rear of the turret.

The engine is located at the rear of the vehicle on the right side with the fuel tanks being under the floor of the vehicle. The small troop compartment at the rear of the BMP-3 is provided with roof hatches and two doors in the rear that open outwards. As the floor of the troop compartment is so high from the ground, steps unfold as the rear doors are opened.

The vehicle is fully amphibious being propelled in the water by two waterjets mounted at the rear of the hull and before entering the water the trim vane is erected at the front of the vehicle and the bilge pumps are switched on. The suspension is of the adjustable type and the driver can adjust the suspension to suit the type of ground being crossed.

### VARIANTS

BMP-3 reconnaissance, called BRM, or Rys (Lynx).

BMP-3 driver training vehicle.

BMP-3 recovery vehicle (BREM-L).

BMP-3K command vehicle.

BMP-3M, latest model for export

120mm 2S31 Vena artillery system is based on BMP-3 chassis

BMP-3 Kornet-E ATGW system (prototype)

BMP-3 Krizantema ATGW system (prototype)

### STATUS

In production. In service with Azerbaijan, Cyprus, South Korea, Kuwait, Russia, Ukraine and United Arab Emirates (Abu Dhabi)

### MANUFACTURER

Kurgan Machine Construction Plant, Russia.



*Above right: BMP-3*

*Right: BMP-3  
reconnaissance  
vehicle (BRM)*



# BMP-2 Infantry Fighting Vehicle (Russia)

## KEY RECOGNITION FEATURES

- Pointed nose with almost horizontal ribbed glacis plate, driver front left, engine compartment louvres in roof to right, turret slightly to rear of vehicle, troop compartment rear with two roof hatches. Vertical hull rear with two bulged doors opening rear. Similar in appearance to BMP-1 but with different turret and wider hull
- Turret has long-barrelled 30mm cannon with muzzle brake, three forward-firing smoke dischargers each side of turret, ATGW launcher in centre of turret at rear. Four firing ports in left side of hull and three in right plus one in each rear door
- Suspension each side has six road wheels, drive sprocket front, idler rear, track-return rollers covered by skirts with horizontal ribs

## SPECIFICATIONS

|                         |                                                                                                       |
|-------------------------|-------------------------------------------------------------------------------------------------------|
| Crew:                   | 3+7                                                                                                   |
| Armament:               | 1 x 30mm cannon, 1 x 7.62mm MG (coaxial), 1 x Spandrel ATGW launcher, 2 x 3 smoke grenade dischargers |
| Ammunition:             | 500 x 30mm, 2,000 x 7.62mm, 4 x Spandrel ATGW                                                         |
| Length:                 | 6.735m                                                                                                |
| Width:                  | 3.15m                                                                                                 |
| Height:                 | 2.45m                                                                                                 |
| Ground clearance:       | 0.42m                                                                                                 |
| Weight, combat:         | 14,300kg                                                                                              |
| Power-to-weight ratio:  | 20.30hp/tonne                                                                                         |
| Engine:                 | Model UTD-20 6-cylinder diesel developing 300hp at 2,600rpm                                           |
| Maximum road speed:     | 65km/hr                                                                                               |
| Maximum water speed:    | 7km/hr                                                                                                |
| Maximum road range:     | 600km                                                                                                 |
| Fuel capacity:          | 462 lit                                                                                               |
| Fording:                | Amphibious                                                                                            |
| Vertical obstacle:      | 0.7m                                                                                                  |
| Trench:                 | 2.5m                                                                                                  |
| Gradient:               | 60%                                                                                                   |
| Side slope:             | 30%                                                                                                   |
| Armour:                 | Classified                                                                                            |
| Armour type:            | Steel                                                                                                 |
| NBC system:             | Yes                                                                                                   |
| Night vision equipment: | Yes (commander, gunner and driver)                                                                    |

## DEVELOPMENT

The BMP-2 IFV is a further development of BMP-1 and was first seen in public during a Moscow parade in 1982. In addition to a more powerful engine BMP-2 has a new two-man turret with different weapons. Driver sits front left with one of the seven infantrymen to his rear, engine compartment to his right. Turret is slightly to rear with troop compartment far rear. Six infantrymen sit three each side back to back, each man with firing port in side of hull and periscope above. Two-man turret has commander on right, gunner on left, new 30mm cannon with powered elevation up to +75° for use against helicopters and slow-flying aircraft, turret traverse 360° and 30mm cannon fully stabilised. 7.62mm MG is mounted coaxial to left of 30mm cannon.

Mounted on turret roof rear is launcher for AT-5 Spandrel ATGW which has maximum range of 4,000m. Some vehicles have launcher for 2500mm AT-4 Spigot instead. Some BMP-2s have applique armour on turrets and hulls. BMP-2 is fully amphibious, propelled by its tracks. Before entering the water a trim vane is erected at front of hull and bilge pumps switched on.

## VARIANTS

BMP-2D, late production vehicle with applique armour and provision for fitting mine clearing equipment under nose of vehicle.

BMP-2K, command version with additional communications equipment.

BVP-2, Czechoslovakian designation for BMP-2.

A number of upgrades are available including the Kliver turret and another with standard turret but with new sights and 30mm grenade launcher.



## TRACKED APCs /WEAPONS CARRIERS

### STATUS

Production complete. In service with Afghanistan, Algeria, Angola, Armenia, Azerbaijan, Belarus, Czech Republic, Finland, Georgia, India, Iran, Iraq, Jordan, Kazakhstan, Kyrgystan, Kuwait, Russia, Sierra Leone, Slovakia, Sri Lanka, Sudan, Syria, Tajikistan, Togo, Turkenistan, Ukraine, Uzbekistan and Yemen.

### MANUFACTURER

Russian state arsenals. Manufactured under licence in former Czechoslovakia and India. The latter country calls it the Sarath and has developed numerous variants.



Above: BMP-2



Above: BMP-2 (Steven Zaloga)



Above: BMP-2



# BMP-1 Infantry Combat Vehicle (Russia)

## KEY RECOGNITION FEATURES

- Pointed nose with almost horizontal ribbed glacis plate, driver front left, engine compartment louvres in roof to right, turret slightly to rear of vehicle, troop compartment rear with four roof hatches, two each side. Vertical hull rear with two bulged doors opening rear. Similar in appearance to BMP-2 but with different turret with long-barrelled 30mm cannon and wider hull
- Circular turret with well sloped sides has 73mm gun with launcher above for Sagger ATGW (not always installed in peacetime), single gunner's hatch on left side of roof. Four firing ports each side of hull
- Suspension each side has six road wheels, drive sprocket at front, idler rear, and three track-return rollers. Upper part of track covered by skirts

## SPECIFICATIONS

|                          |                                                                                       |
|--------------------------|---------------------------------------------------------------------------------------|
| Crew:                    | 3+8                                                                                   |
| Armament:                | 1 x 73mm, 1 x 7.62mm MG (coaxial),<br>1 x Sagger ATGW launcher                        |
| Ammunition:              | 40 x 73mm, 2,000 x 7.62mm,<br>1+4 Sagger ATGW                                         |
| Length:                  | 6.74m                                                                                 |
| Width:                   | 2.94m                                                                                 |
| Height over searchlight: | 2.15m                                                                                 |
| Ground clearance:        | 0.39m                                                                                 |
| Weight, combat:          | 13,500kg                                                                              |
| Weight, empty:           | 12,500kg                                                                              |
| Power-to-weight ratio:   | 22.22hp/tonne                                                                         |
| Ground pressure:         | 0.ekg/cnf                                                                             |
| Engine:                  | Type UTD-20 6-cylinder in-line<br>water-cooled diesel developing<br>300hp at 2,000rpm |
| Maximum road speed:      | 65km/hr                                                                               |
| Maximum water speed:     | 7km/hr                                                                                |
| Maximum road range:      | 600km                                                                                 |
| Fuel capacity:           | 460 lit                                                                               |
| Fording:                 | Amphibious                                                                            |
| Vertical obstacle:       | 0.8m                                                                                  |
| Trench:                  | 2.2m                                                                                  |
| Gradient:                | 60%                                                                                   |
| Side slope:              | 30%                                                                                   |
| Armour:                  | 33mm (maximum)                                                                        |
| Armour type:             | Steel                                                                                 |
| NBC system:              | Yes                                                                                   |
| Night vision equipment:  | Yes (infra-red for commander,<br>gunner and driver)                                   |

## DEVELOPMENT

BMP-1 was developed in the early 1960s to replace BTR-50P series tracked APCs and was first seen in public during 1967. It was replaced in production by BMP-2 ICV (previous entry) which, although similar in appearance, has slightly different layout and new turret and weapon system.

In the BMP-1, driver sits front left with vehicle commander to rear, engine compartment is to right of driver with one-man turret centre and troop compartment rear. Turret power-traverses through 360° and 73mm gun elevates from -4° to +33° and fires HEAT or HE-FRAG rounds. 7.62mm MG is mounted coaxial to right of 73mm gun and mounted over gun is launcher for AT-3 Sagger wire-guided ATGW which has maximum range of 3,000m.

Troop compartment is at rear with eight infantry seated four each side back to back. In each side of troop compartment are four firing ports with periscope above, and in each of two rear doors is a further firing port and periscope.

BMP-1 is fully amphibious, propelled by its tracks. Before entering the water a trim vane is erected at front of vehicle and bilge pumps switched on.

As BMP-1 was produced for some 20 years there are minor detailed differences between production models.

## VARIANTS

BMP-1F, reconnaissance model used by Hungary.

BMP-1 K, BMP-1 commander's model.

BMP-1K3, BMP-1 commander's model.

BMP-IP, BMP-1 with no Sagger and roof-mounted AT-4 ATGW fitted.

BMP-1 PK, BMP-IP commander's model.

BRM-1K, BRM-1 basic reconnaissance - armoured cavalry.

BREM-1 and BREM-4, recovery vehicles.

BMP-IKShM, unarmed command version of BMP-1.

BWP, Polish version of BMP-1.

**Czech** BMP-1, many variants including OT-90 (BMP-1 with turret of OT-64C(1)).

Egyptian BMP-1, have new French diesel engine.

BMP-1 can be fitted with mine clearing equipment.

BMP-1 has been fitted with 30mm grenade launcher.

**BRM** and BRM-1 reconnaissance vehicles, new two-man turret.

PRP-3 Radar, two-man turret in radar in roof.

IRM, Amphibious reconnaissance vehicle.

BMP-POO, Mobile Training Centre, no turret, raised roof, Iraqi versions include ambulance and basic vehicle with applique armour.

BMP-1G, for export, no Sagger, roof-mounted Spandrel ATGW plus 30mm grenade launcher.

### STATUS

Production complete. In service with Afghanistan, Algeria, Angola, Armenia, Azerbaijan, Belarus, Bulgaria, Cuba, Czech Republic, Egypt, Ethiopia, Finland, Georgia, Greece, Hungary, India, Iran, Iraq, Kazakhstan, Korea (North), Kyrgystan, Libya, Mongolia, Mozambique, Poland, Romania, Russia, Slovakia, Sri Lanka, Sweden, Syria, Tajikistan, Turmenistan, Ukraine, Uruguay, Vietnam and Yemen.

### MANUFACTURER

Former Czechoslovak and Russian state arsenals.

China builds a version of BMP-1 designated WZ 501.



Above: BMP-1



Left: BMP-1

# BMD-3 Airborne Combat Vehicle (Russia)

## KEY RECOGNITION

### FEATURES

- Pointed nose with horizontal hull top extending to rear of hull, three hatches in hull top at the front, turret (as fitted to BMP-2) in the centre, louvers in hull top either side, vertical hull rear
- Turret has long barreled 30 mm cannon that overhangs front of vehicle, hull sides are almost vertical
- Suspension either side consists of five road wheels with idler at the front, drive sprocket at the rear and four track return rollers

## SPECIFICATIONS

|                                |                                                                                                                                                   |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Crew:                          | 2 + 5                                                                                                                                             |
| Armament:                      | 1 x 30mm cannon, 1 x 7.62mm MG (coaxial), 1 x AT-4/ AT-5 ATGW launcher, 1 x 7.62mm MG (bow), 1 x 40mm grenade launcher (bow), 1 x 5.45mm MG (bow) |
| Ammunition:                    | 860 x 30mm, 2000 x 7.62mm, 2160 x 5.45mm, 551 x 30mm grenade, 4 x ATGW, 2 x 3 smoke grenade launchers                                             |
| <u>Length:</u>                 | 6.36m                                                                                                                                             |
| <u>Width:</u>                  | 3.134m                                                                                                                                            |
| <u>Height:</u>                 | 2.170m                                                                                                                                            |
| <u>Ground clearance:</u>       | 0.15 to 0.53m                                                                                                                                     |
| <u>Weight, combat:</u>         | 13 200kg                                                                                                                                          |
| <u>Power-to-weight ratio:</u>  | 34hp/tonne                                                                                                                                        |
| Engine:                        | 2V-06 water-cooled diesel                                                                                                                         |
| <u>Maximum road speed:</u>     | 71km/h                                                                                                                                            |
| <u>Maximum road range:</u>     | 500km                                                                                                                                             |
| <u>Fuel capacity:</u>          | 450l                                                                                                                                              |
| <u>Fording:</u>                | Amphibious                                                                                                                                        |
| <u>Vertical obstacle:</u>      | 0.8m (estimate)                                                                                                                                   |
| <u>Trench:</u>                 | 1.8m (estimate)                                                                                                                                   |
| <u>Gradient:</u>               | 60%                                                                                                                                               |
| <u>Side slope:</u>             | 30%                                                                                                                                               |
| <u>Armour:</u>                 | Classified                                                                                                                                        |
| <u>Armour type:</u>            | Aluminium                                                                                                                                         |
| <u>NBC:</u>                    | Yes                                                                                                                                               |
| <u>Night vision equipment:</u> | Yes                                                                                                                                               |

## DEVELOPMENT

The BMD-3 has been developed as the follow-on to the earlier BMD-1 and BMD-2 airborne combat vehicles with the BMD-3 being larger and much heavier. Production commenced in 1989 and so far it has been identified only in service with Russian airborne units.

The driver is seated in the front of the hull in the centre with another person either side. Mounted in the left side of the hull is a 30 mm AG-17 automatic grenade launcher while in the right side is mounted a 5.45 mm RPKS machine gun.

The two man power operated turret is mounted in the centre of the forward part of the hull and is the same as that fitted to the BMP-2 ICV and armed with a 30mm 2A42 cannon with a 7.62mm machine gun mounted coaxial. Turret traverse is 360 degrees with weapon elevation from -5 to +75 degrees. Mounted on the turret roof is a launcher for the AT-4 or AT-5 ATGW.

An unusual feature of the BMD-3 is its hydropneumatic suspension system which allows the ground clearance to be varied from 150mm to 530mm, normal ground clearance is 450 mm. The standard tracks are 320mm wide but these can be replaced by wider 480mm tracks.

The BMD-3 is fully amphibious being propelled in the water at a speed of 10km/h by two waterjets mounted at the rear of the hull. Before entering the water a trim vane is erected at the front of the hull and the bilge pumps are switched on.

## VARIANTS

There are no known variants but it is assumed that specialised versions of the BMP-3 are under development along similar lines to those of the BMD-1 and BMD-2.

## TRACKED APCs /WEAPONS CARRIERS



### STATUS

In production. In service only with Russia.

### MANUFACTURER

Volgograd Tractor Plant, Russia

**Above:  
BMD-3**

**Above right:  
BMD-3**

**Right:  
BMD-3**

**Far right:  
BMD-3**



# BMD-1 Airborne Combat Vehicle (Russia)

## KEY RECOGNITION FEATURES

- Same turret as BMP-1 ICV mounted on forward part of hull roof with Sagger ATGW over 73mm gun
- Suspension each side has five small road wheels, drive sprocket rear, idler front, four track-return rollers (first and fourth support inside of track only)
- Pointed nose with trim vane on glacis plate, hull sides vertical with slight chamfer along two-thirds of hull side

## SPECIFICATIONS

|                         |                                                                                                  |
|-------------------------|--------------------------------------------------------------------------------------------------|
| Crew:                   | 3+4                                                                                              |
| Armament:               | 1 x 73mm (main), 1 x 7.62mm MG (coaxial), 1 x AT-3 Sagger launcher, 2 x 7.62mm forward-firing MG |
| Ammunition:             | 40 x 73mm, 2,000 x 7.62mm, 3 x Sagger                                                            |
| Length:                 | 5.4m                                                                                             |
| Width:                  | 2.63m                                                                                            |
| Height:                 | 1.62m to 1.97m                                                                                   |
| Ground clearance:       | 0.1 to 0.45m                                                                                     |
| Weight, combat:         | 7,500kg                                                                                          |
| Power-to-weight ratio:  | 32hp/tonne                                                                                       |
| Ground pressure:        | 0.57kg/cm <sup>2</sup>                                                                           |
| Maximum road speed:     | 70km/hr                                                                                          |
| Maximum water speed:    | 10km/hr                                                                                          |
| Maximum road range:     | 320km                                                                                            |
| Fuel capacity:          | 300 lit                                                                                          |
| Fording:                | Amphibious                                                                                       |
| Vertical obstacle:      | 0.8m                                                                                             |
| Trench:                 | 1.6m                                                                                             |
| Gradient:               | 60%                                                                                              |
| Side slope:             | 30%                                                                                              |
| Armour:                 | 15mm (max hull), 23mm (max turret)                                                               |
| Armour type:            | Aluminium                                                                                        |
| NB&Iy_sternj_           | Yes                                                                                              |
| Night vision equipment: | Yes (commander, gunner and driver, infra-red)                                                    |

## DEVELOPMENT

The BMD-1 was developed to meet requirements of the Russian Airborne forces and was first seen in public in 1973. Driver sits front centre, commander to his left and bow machine gunner to his right. Turret is identical to BMP-1 ICV's and has 73mm 2A28 smoothbore gun fed by automatic loader with 7.62mm PKT MG mounted coaxially to right. Guns power-elevate from -4° to +30°, turret traverses through 360°. Mounted over 73mm gun is an AT-3 Sagger wire-guided ATGW and in each corner of bow is a 7.62mm MG. To rear of turret sit remaining three crew members, engine is far rear of hull.

The vehicle is fully amphibious, propelled by two waterjets mounted at rear, and is fitted with smoke generating equipment and engine pre-heater. Hydropneumatic suspension allows height adjustment.

## VARIANTS

BMD-1 P, BMD-1 with Sagger removed and fitted with pintle-mounted AT-4 Spigot ATGW on turret roof.

BMD-2, new turret armed with 30mm cannon as used in BMP-2, 7.62mm coaxial MG and pintle mount on roof for AT-4 Spigot or AT-5 Spandrel ATGW. Only one bow-mounted 7.62mm MG.

82mm mortar carrier, BMD-1 with 82mm mortar in rear, probably field expedient for Afghanistan.

BTR-D APC, longer chassis with no turret six road wheels, higher roof.

BMD-KShM, command version of above.

BMD-OOB, communications vehicle

BRhM-D, repair and recovery vehicle.

1V118, BMD artillery observation post vehicle.

## TRACKED APCs /WEAPONS CARRIERS

1V119, BMD artillery fire direction centre vehicle.

BMD-1 with RPV, BMD-KShM is used as launcher for Shmel RPV.

BREM-D, BMD ARV.

BTR-D, BTR-D towing or carrying ZU-23 LAAG.

SO-120, BMD chassis is used as basis for SO-120 (or 2S9) 120mm self-propelled howitzer/mortar covered in Self-propelled Guns and Howitzers section.

### STATUS

Production complete. In service with Angola, Armenia, Azerbaijan, Belarus, Uzbekistan, India, Iraq, Moldova, Russia and Ukraine.

### MANUFACTURER

Russian state arsenals, possibly Izhevsk.



*Above: BMD-2 which has new turret armed with 30mm cannon (Steven Zaloga)*

*Left: BMD-1.*



# 120mm SO-120 SPH/Mortar (2S9) (Russia)

## KEY RECOGNITION FEATURES

- Hull similar to BMD-1 airborne combat vehicle but fitted with larger turret with sloped front, sides curve round to rear, 120mm weapon level with front of hull
- Well sloped glacis plate, horizontal hull top with driver's hatch in centre, second hatch to his left, turret in centre of hull
- Vertical hull sides and rear with six road wheels, idler front, drive sprocket rear, five track-return rollers

## SPECIFICATIONS

|                              |                                    |
|------------------------------|------------------------------------|
| Crew:                        | 4                                  |
| Armament:                    | 1 x 120mm mortar                   |
| Ammunition:                  | 25 x 120mm                         |
| Length:                      | 6.02m                              |
| Width:                       | 2.63m                              |
| Height:                      | 2.3m (with max ground clearance)   |
| Ground clearance (variable): | 0.1 to 0.45m                       |
| Weight, combat:              | 8,700kg                            |
| Power-to-weight ratio:       | 27.58hp/tonne                      |
| Ground pressure:             | 0.5kg/cm <sup>2</sup>              |
| Engine:                      | Model 5D20 diesel developing 240hp |
| Maximum road speed:          | 60km/hr                            |
| Maximum water speed:         | 9km/hr                             |
| Maximum road range:          | 500km                              |
| Fuel capacity:               | 400 lit                            |
| Fording:                     | Amphibious                         |
| Vertical obstacle:           | 0.8m                               |
| Trench:                      | 1.8m                               |
| Gradient:                    | 60%                                |
| Side slope:                  | 33%                                |
| Armour:                      | 15mm(max)(hull)                    |
| Armour type:                 | Aluminium                          |
| NBC system:                  | Yes                                |
| Night vision equipment:      | Yes (infra-red for driver)         |

## DEVELOPMENT

The 120mm SO-120 (industrial number 2S9) Anona (Anemone) self-propelled howitzer/mortar was developed in the early 1980s and first seen in public in 1985. It was originally developed for use by the then Soviet air assault divisions, but has since been deployed with other units.

It is essentially a modified BTR-D air assault transporter, which was itself developed from the BMD-1 airborne combat vehicle, with a modified hull and fitted with a new fully enclosed turret armed with a 120mm breech-loaded mortar. Turret traverse is 35 degrees left and right with weapon elevation from -4 degrees to +80 degrees, maximum range of the mortar is 8,855m.

An automatic rammer is fitted which enables a rate of fire of six to eight rounds a minute to be fired and after the breech opens when a round is fired the rammer bleeds compressed air into the chamber to force firing fumes from the muzzle.

The driver is seated at the front of the SO-120 in the centre with the commander being seated to the left, the turret is in the centre with the engine and transmission at the rear. The hydropneumatic suspension system can be adjusted to give a ground clearance from 100 to 450mm. It is also fully amphibious being propelled in the water by two waterjets mounted at the rear of the hull. Before entering the water, bilge pumps are switched on and two splash vanes are erected to the immediate front of the driver's position.

## VARIANTS

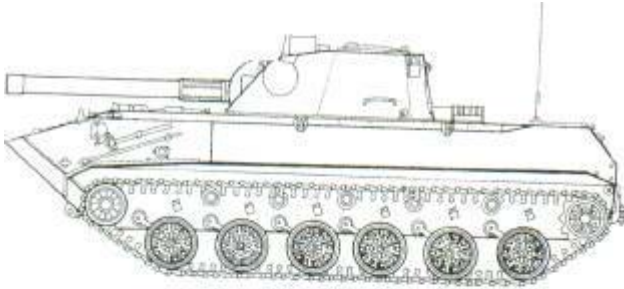
There are no known variants of the 2S9 although its turret, in a slightly modified version, is installed on the 2S23 (8x8) self-propelled howitzer/mortar (qv).

The 1V118 artillery observation post vehicle and the 1V119 artillery fire detection vehicle used with the 2S9 are based on chassis of BMD-1 vehicle.

## STATUS

Production complete. In service with Afghanistan, Azerbaijan, Belarus, Kyrgyzstan, Moldova, Russia, Turkmenistan, Ukraine, Uzbekistan and Vietnam (unconfirmed user).





**MANUFACTURER**

Russian state factories.

**Above: 120mm SO-120 SPH/mortar (2S9) (Steven Zaloga)**

**Above right: 120mm SO-120 SPH/mortar (2S9)**

**Right: 120mm SO-120 SPH/mortar (2S9)**



# Singapore Technologies Automotive Bionix 25 IFV (Singapore)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver on left side leads up to horizontal hull top that extends to the rear. Large turret with pointed front and sloping sides in centre of hull. To rear of turret is roof hatch that opens to rear
- Vertical hull rear with ramp, hull sides vertical with each side having six road wheels with drive sprocket at front, idler at rear and return rollers

## SPECIFICATIONS

|                         |                                                                                                         |
|-------------------------|---------------------------------------------------------------------------------------------------------|
| Crew:                   | 3 + 7                                                                                                   |
| Armament:               | 1 x 25mm cannon, 1 x 7.62mm MG (co-axial), 1 x 7.62mm MG (anti-aircraft), 2 x 3 smoke grenade launchers |
| Ammunition:             | Classified                                                                                              |
| Length hull:            | 5.90m                                                                                                   |
| Width:                  | 2.70m                                                                                                   |
| Height:                 | 2.60m                                                                                                   |
| Ground clearance:       | 0.475m                                                                                                  |
| Weight, combat:         | 23,000kg                                                                                                |
| Weight, empty:          | 21,000kg                                                                                                |
| Power-to-weight ratio:  | 20 hp/tonne                                                                                             |
| Ground pressure:        | 0.76 kg/cm <sup>2</sup>                                                                                 |
| Engine:                 | Detroit Diesel Model 6V-92TA diesel developing 475 hp                                                   |
| Maximum road speed:     | 70km/h                                                                                                  |
| Maximum road range:     | 415km                                                                                                   |
| Fuel capacity:          | 527litres                                                                                               |
| Fording:                | 1m                                                                                                      |
| Vertical obstacle:      | 0.60m                                                                                                   |
| Trench:                 | 2.0m                                                                                                    |
| Gradient:               | 60%                                                                                                     |
| Side slope:             | 30%                                                                                                     |
| Armour:                 | Classified                                                                                              |
| Armour type:            | Steel plus applique                                                                                     |
| NBC system:             | No                                                                                                      |
| Night vision equipment: | Yes                                                                                                     |

## DEVELOPMENT

The Bionix 25 IFV (infantry fighting vehicle) was developed to meet the operational requirements of the Singapore Armed Forces by Singapore Technologies Automotive. Following trials with prototypes and pre-production vehicles it was accepted for service and first production vehicles were completed in 1997.

The driver is seated towards the front of the hull on the left side with the engine compartment to his right, turret in the centre and troop compartment at the rear.

The power operated turret is armed with The Boeing Company stabilised 25mm M242 cannon with a 7.62mm machine gun being mounted co-axial. Turret traverse is 360 degrees with the gunner being provided with a day/thermal sight. A 7.62mm machine gun is mounted on the turret roof for air defence purposes.

The infantry enter and leave via a power operated ramp in the hull rear and a 7.62 mm machine gun can be mounted over the top of the troop compartment.

## VARIANTS

In addition to the Bionix 25 one other variant is in service with Singapore, the Bionix 40/50. This is fitted with an locally developed one person cupola armed with a locally developed 40 mm grenade launcher and 12.7mm machine gun. This cupola is also fitted to some of the upgraded M113 series APCs used by Singapore. Other variants of the Bionix are under development including command post and repair/recovery.

## STATUS

Production. In service with Singapore.

## MANUFACTURER

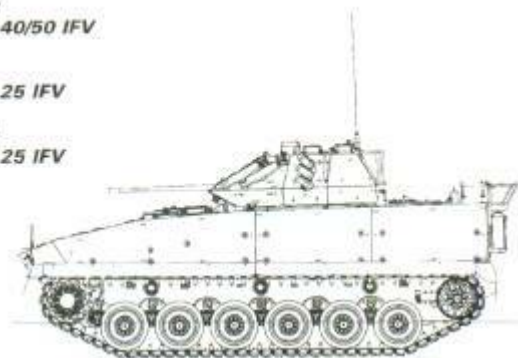
Singapore Technologies Automotive



**Above:**  
**Bionix 40/50 IFV**

**Right:**  
**Bionix 25 IFV**

**Below:**  
**Bionix 25 IFV**



# Daewoo Korean Infantry Fighting Vehicle (South Korea)

## KEY RECOGNITION

### FEATURES

- Well sloped glacis plate with trim vane, driver front left, commander's cupola with external 7.62mm MG to rear of driver, gunner's cupola with shield, 12.7mm MG right
- Troop compartment rear with single roof hatch, ramp in hull rear, two firing ports with vision block in each side of troop compartment
- Suspension has five road wheels, drive sprocket front, idler rear, no track-return rollers

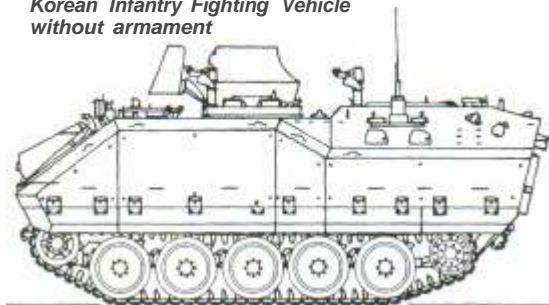
## SPECIFICATIONS

|                                |                                                                         |
|--------------------------------|-------------------------------------------------------------------------|
| Crew:                          | 3+7                                                                     |
| Armament:                      | 1 x 12.7mm MG, 1 x 7.62mm MG,<br><u>1 x 6 smoke grenade dischargers</u> |
| <u>Length:</u>                 | <u>5.486m (overall)</u>                                                 |
| Width:                         | 2.846m                                                                  |
| Height:                        | <u>1.93m (hull top), 2.518m (MG shield)</u>                             |
| Ground clearance:              | 0.41m                                                                   |
| <u>Weight, combat:</u>         | <u>12,900kg</u>                                                         |
| <u>Weight, empty:</u>          | <u>10,700kg</u>                                                         |
| <u>Power to weight ratio:</u>  | <u>21.70hp/tonne</u>                                                    |
| <u>Ground pressure:</u>        | <u>0.63kg/cm<sup>2</sup></u>                                            |
| Engine:                        | MAN D-2848T V-8 diesel developing<br><u>280hp at 2,300rpm</u>           |
| <u>Maximum road speed:</u>     | <u>74km/hr</u>                                                          |
| Maximum water speed:           | 6km/hr                                                                  |
| <u>Maximum cruising range:</u> | <u>480km</u>                                                            |
| <u>Fuel capacity:</u>          | <u>400 lit</u>                                                          |
| <u>Fording:</u>                | <u>Amphibious</u>                                                       |
| Vertical obstacle:             | 0.64m                                                                   |
| Trench:                        | 1.68m                                                                   |
| Gradient:                      |                                                                         |
| Side slope:                    |                                                                         |
| Armour:                        | Classified                                                              |
| <u>Armour type:</u>            | Aluminium and steel                                                     |
| <u>NBC system:</u>             | Yes                                                                     |
| Night vision equipment:        | Yes (passive for commander and driver)                                  |

## DEVELOPMENT

Korean Infantry Fighting Vehicle was developed to meet requirements of South Korean Army by Special Products

*Korean Infantry Fighting Vehicle without armament*



Division of Daewoo Heavy Industries with hull very similar to US Armored Infantry Fighting Vehicle. KIFV has MAN engine, British Self-Changing Gears T-300 fully automatic transmission and different roof arrangement.

Commander has pintle-mounted 7.62mm M60 MG which cannot be fired from inside vehicle, gunner has full front, side and rear protection for 12.7mm M2 HB MG. Mounted on glacis plate is bank of six electrically operated smoke grenade dischargers firing forwards. KIFV is fully amphibious.

## VARIANTS

More recently Daewoo has offered an improved version of the KIFV with a new powerpack consisting of the D2848T turbocharged diesel developing 350hp coupled to an Allison X-200-5D series fully automatic transmission.

20mm SPAAG, basic KIFV fitted with locally produced Vulcan 20mm anti-aircraft gun system that is made in South Korea. Mortar carrier, two versions, 81mm and 107mm.

Recovery, fitted with roof-mounted hydraulic crane and a winch for recovery operations.

TOW anti-tank, can be fitted with various TOW anti-tank systems including the Norwegian one-man turret with two TOW ATGW in ready-to-launch position.

NBC reconnaissance, no weapons stations and fitted with a complete range of NBC detection systems. Command, would have higher roof similar to that of the US M577 vehicle.

### NEW GENERATION

In 1992 the company unveiled a new family of vehicles with a new and more powerful powerpack. These include an ammunition resupply vehicle and a twin 30mm self-propelled anti-aircraft gun system. These are both in volume production and have a larger and different chassis than the KIFV.

### STATUS

In production. In service with South Korean Army and Malaysia.

### MANUFACTURER

Daewoo Heavy Industries, Seoul, South Korea.

*Right: Korean Infantry Fighting Vehicle (Richard Stickland)*



*Right: Korean Infantry Fighting Vehicle (Richard Stickland)*



# ASCOD MICV (Spain/Austria)

## KEY RECOGNITION FEATURES

- Hull has vertical sides with well sloped glacis plate leading up to horizontal hull top which extends right to rear of vehicle. Hull rear vertical but large stowage bin either side of rear door
- Driver front left with powerpack to right, turret in centre of hull and offset to right
- Suspension either side consists of seven road wheels, drive sprocket front, idler rear and track return rollers, upper part of suspension covered by wavy skirt

## SPECIFICATIONS

|                         |                                                                |
|-------------------------|----------------------------------------------------------------|
| Crew:                   | 3 + 8                                                          |
| Armament:               | 1 x 25mm cannon, 1 x 7.62mm MG, 2 x 6 smoke grenade launchers  |
| Ammunition:             | 402 x 25mm, 2900 x 7.62mm                                      |
| Length:                 | 6.986m                                                         |
| Width:                  | 3.15m                                                          |
| Height:                 | 1.775m (hull top), 2.653m (overall)                            |
| Ground clearance:       | 0.45m                                                          |
| Weight, combat:         | 27,500kg                                                       |
| Power-to-weight ratio:  | 21.8 hp/tonne                                                  |
| Engine:                 | MTU 8V 183 TE22 8 V-90 V-8 diesel developing 600 hp at 2300rpm |
| Maximum road speed:     | 70km/h                                                         |
| Maximum road range:     | 600km                                                          |
| Fuel capacity:          | 860l                                                           |
| Fording:                | 1.2m                                                           |
| Vertical obstacle:      | 0.95m                                                          |
| Trench:                 | 2.50m                                                          |
| Gradient:               | 75o/o                                                          |
| Side slope:             | 40o/o                                                          |
| Armour:                 | Classified                                                     |
| Armour type:            | Steel                                                          |
| NBC:                    | Yes                                                            |
| Night vision equipment: | Yes                                                            |

## DEVELOPMENT

The ASCOD (Austrian Spanish Co-Operative Development) mechanised infantry combat vehicle has been jointly developed by Steyr-Daimler-Puch of Austria and SANTA BARBARA of Spain with the latter country placing the first production order for a total of 144 vehicles under the local name of Pizarro early

in 1996. Austrian Army has placed an order for 112 vehicles under name of Ulan.

The driver is seated at front left with the powerpack to his right, turret in the centre and the troop compartment at the rear. The infantry enter and leave via a large door in the hull rear that opens to the right.

The two man power operated turret is armed with a stabilised Mauser 30mm cannon with a 7.62mm machine gun being mounted co-axial to the left. Turret traverse is through a full 360 degrees with weapon elevation from -10 to +50 degrees.

Standard equipment includes a NBC protection system, heater, applique armour and a computerised day/night fire control system.

## VARIANTS

Anti-tank with various ATGW  
Armoured recovery and repair vehicle  
Armoured command vehicle  
Armoured engineer vehicle  
Armoured mortar carrier  
MICV, various alternative weapon fits  
Light tank with 105 mm gun  
SAM system  
SPAAG

## STATUS

Production. In service with Spanish Army (as Pizarro) and on order for Austrian Army (as Ulan).

## Manufacturers

Austria, Steyr-Daimler-Puch  
Spain, SANTA BARBARA





*Above:ASCOD  
MICV*



*Above right:  
ASCOD MICV*

*Far right:  
ASCOD MICV*

*Right:  
ASCOD MICV*





# Hagglunds Vehicle Pbv 302 APC (Sweden)

## KEY RECOGNITION FEATURES

- Hull front slopes to rear and curves to join vertical sides, hull rear also vertical and curves to join sides, twin doors rear, hatches over rear troop compartment
- Driver's cupola at front with commander's cupola right and large 20mm gun turret left
- Suspension has five large road wheels, drive sprocket front, idler rear, no track-return rollers

## SPECIFICATIONS

|                         |                                                                                                 |
|-------------------------|-------------------------------------------------------------------------------------------------|
| Crew:                   | 2+10                                                                                            |
| Armament:               | 1 x 20mm cannon, 1 x 6 smoke grenade dischargers, 2 x Lyran launchers                           |
| Ammunition:             | 505 x 20mm                                                                                      |
| Length:                 | 5.35m                                                                                           |
| Width:                  | 2.86m                                                                                           |
| Height:                 | 2.5m (turret top), 1.9m (hull top)                                                              |
| Ground clearance:       | 0.4m                                                                                            |
| Weight, combat:         | 13,500kg                                                                                        |
| Power-to-weight ratio:  | 20.74hp/tonne                                                                                   |
| Ground pressure:        | 0.6kg/cm <sup>2</sup>                                                                           |
| Engine:                 | Volvo-Penta model THD 100B horizontal 4-stroke turbocharged diesel developing 280hp at 2,200rpm |
| Maximum road speed:     | 66km/hr                                                                                         |
| Maximum water speed:    | 8km/hr                                                                                          |
| Maximum road range:     | 300km                                                                                           |
| Fuel capacity:          | 285 lit                                                                                         |
| Fording:                | Amphibious                                                                                      |
| Vertical obstacle:      | 0.61m                                                                                           |
| Trench:                 | 1.8m                                                                                            |
| Gradient:               | 60%                                                                                             |
| Side slope:             | 40%                                                                                             |
| Armour:                 | Classified                                                                                      |
| Armour type:            | Steel                                                                                           |
| NBC system:             | None                                                                                            |
| Night vision equipment: | None                                                                                            |

## DEVELOPMENT

Pbv 302 (Pansarbandvagn 302) was developed by the then Hagglund and Soner to meet requirements of Swedish Army with prototype completed in 1962 and production from 1965 to 1971. Hull is all-welded steel armour with spaced armour in the sides for increased protection. Engine is mounted under floor of vehicle with crew compartment front and infantry compartment rear. Ten infantrymen sit five each side facing, and enter and leave via two doors in rear. They can fire small arms via roof hatches.

Turret is manually operated and armed with 20mm cannon with elevation of +50° and depression of -10°, turret traverses 360°, cannon can be fed by belt containing 135 rounds of HE ammunition or box magazine holding 10 rounds of AP ammunition. Pbv 302 is fully amphibious, propelled by its tracks. Before entering the water trim vanes are erected at front of vehicle and bilge pumps switched on.

Further development resulted in the Pbv 302 Mk 2 and the Product Improved Pb 302, but none of these entered production. Hagglunds and Soner is now known as Hagglunds Vehicle. For operations in the former Yugoslavia, some Pbv 302s were fitted with additional armour protection.

## VARIANTS

Stripbv 3021 armoured command vehicle has four radio antennas compared to Pbv 302's two, and additional communications equipment.

Epbv 3022 is an armoured observation post vehicle and has commander's hatch replaced by cupola with rangefinding devices, three radio antennas, additional buoyancy aids on trim vanes.



Bp1pbv 3023 is armoured fire direction post vehicle with four antennas and fire-control/communications equipment inside.

**STATUS**

Production complete. In service with Swedish Army only.

**MANUFACTURER**

Hagglunds Vehicle AB, Ornsköldsvik, Sweden.

*Above: Pbv 302 APC  
(Christopher F Foss)*

*Right: Pbv 302 APC with applique armour  
added to hull and turret*



# Combat Vehicle 90 (Stridsfordon 90) (Sweden)

## KEY RECOGNITION FEATURES

- Hull has well sloped glacis plate with turret in centre that is offset slightly to left of hull. The sides and rear of hull are vertical with large door in hull rear
- Suspension either side consists of seven road wheels very close together, drive sprocket front, idler rear and upper part of suspension covered by skirt with wavy bottom
- Turret of 40mm version has sloped front, vertical sides and rear, 40mm cannon has distinctive muzzle with large gunner's sight in the right of turret roof

## SPECIFICATIONS

|                         |                                                                    |
|-------------------------|--------------------------------------------------------------------|
| Crew:                   | 3+8                                                                |
| Armament:               | 1 x 40mm, 1 x 7.62mm MG (coaxial), 2 x 3 smoke grenade dischargers |
| Length:                 | 6.471m                                                             |
| Width:                  | 3.003m                                                             |
| Height:                 | 2.5m (turret roof), 1.73m (hull top)                               |
| Ground clearance:       | 0.45m                                                              |
| Weight, combat:         | 22,800kg                                                           |
| Power-to-weight ratio:  | 24.12hp/tonne                                                      |
| Ground pressure:        | 0.53kg/cm <sup>2</sup>                                             |
| Engine:                 | Scania DS14 diesel developing 550hp                                |
| Maximum road speed:     | 70km/hr                                                            |
| Maximum road range:     | Not available                                                      |
| Fuel capacity:          | 525 lit                                                            |
| Fording:                | 1.40m                                                              |
| Vertical obstacle:      | 1.0m                                                               |
| Trench:                 | 2.4m                                                               |
| Gradient:               | 60%                                                                |
| Side slope:             | 40%                                                                |
| Armour:                 | Classified                                                         |
| Armour type:            | Steel                                                              |
| NBC system:             | Yes                                                                |
| Night vision equipment: | Yes (passive)                                                      |

## DEVELOPMENT

In 1985 HB Utveckling, a small holding company jointly established by Bofors and Hagglands and Soner (now Hagglands Vehicle), were awarded a contract by the Swedish Defence Material Administration for the construction of five prototypes of the Stridsfordon 90 (or Combat Vehicle 90) family of armoured vehicles for the Swedish Army. Before this, under

separate contracts, an automotive test rig and a two-man 40mm turret had been funded. In 1986 a further contract was awarded for four two-man turrets, three with the 40mm cannon and one with a 25mm cannon.

Early in 1991 the first production order was placed for the Combat Vehicle 90 (CV 9040) with first production vehicles delivered in October 1993. Hagglands Vehicle build all of the chassis and send these to Bofors who will build the 40mm turrets and integrate this with the chassis and then deliver the complete system to the Swedish Army.

The driver is seated at the front of the vehicle on the left side with the powerpack to his right, the two-man turret is in the centre with the troop compartment at the rear. The infantry are seated either side facing inwards and enter and leave via a door in the rear. Roof hatches are also provided but there is no provision for the infantry to use their weapons from within the vehicle.

The 40mm gun has an elevation of +35° and a depression of -8° with turret traverse a full 360°, the CV 9040 has fully powered traverse and elevation with manual controls for emergency use.

## VARIANTS

CV 9025 IFV, two man turret, 25mm cannon, prototype only.  
TriAD 40mm self-propelled anti-aircraft gun, Swedish Army.  
CV 90 Forward Command Vehicle, Swedish Army.  
CV 90 Forward Observation Vehicle, Swedish Army.  
CV **90** Armoured Recovery Vehicle, Swedish Army.  
CV 90 anti-tank, concept.  
CV 9030N, two man 30mm turret, for Norway.  
CV 90105 TML, 105mm turret, trials.  
CV 90120, 120mm light tank, trials only  
CV 9, twin 120mm mortar, trials only

## TRACKED APCs /WEAPONS CARRIERS



### STATUS

Production. In service with Norway and Sweden.

### MANUFACTURER

Bofors, Sweden (turret) and Hagglunds Vehicle, Ornskoldsvik, Sweden (chassis) (but see text).

*Above: CV 9030N IFV*

*Above right: CV 9040 IFV*

*Right: Triad 40mm SPAAG*



# Hagglunds Vehicle Pvrbv 551 Anti-tank Missile Carrier

(Sweden)

## KEY RECOGNITION FEATURES

- High superstructure with glacis plate at about 70°, commander's and driver's cupolas front
- TOW missile launcher retracts into vehicle when not in action
- Suspension has six road wheels, idler front, drive sprocket rear, two track-return rollers. Front part of suspension covered by wavy skirt

## SPECIFICATIONS

|                         |                                                             |
|-------------------------|-------------------------------------------------------------|
| Crew:                   | 4                                                           |
| Armament:               | 1 x TOW ATGW launcher                                       |
| Length:                 | 4.81m                                                       |
| Width:                  | 2.54m                                                       |
| Height:                 | 2.46m (missile and launcher up),<br>1.97m (hull top)        |
| Ground clearance:       | 0.33m                                                       |
| Weight, combat:         | 9,700kg                                                     |
| Power-to-weight ratio:  | 14hp/tonne                                                  |
| Ground pressure:        | 0.4kg/cm <sup>2</sup>                                       |
| Engine:                 | Ford model 2658E V-6 petrol<br>developing 136hp at 5,200rpm |
| Maximum road speed:     | 41km/hr                                                     |
| Maximum road range:     | 300km                                                       |
| Fuel capacity:          | 240 lit                                                     |
| Fording:                | 0.9m                                                        |
| Vertical obstacle:      | 0.61m                                                       |
| Trench:                 | 1.5m                                                        |
| Gradient:               | 60%                                                         |
| Side slope:             | 40%                                                         |
| Armour:                 | Classified                                                  |
| Armour type:            | Steel                                                       |
| NBC system:             | No                                                          |
| Night vision equipment: | Optional for TOW ATGW launcher                              |

## DEVELOPMENT

Pvrbv 551 is the old Ikv-102/Ikv-103 self-propelled infantry cannon extensively rebuilt, including new engine as fitted in unarmoured Bv 206 all-terrain vehicle. Conversion work

undertaken by Hagglund and Soner (now Hagglunds Vehicle AB) with production vehicles delivered to Swedish Army between 1984 and 1986.

In centre of hull roof is large two-part circular opening under which is Raytheon Systems Company TOW ATGW launcher raised above roof when in action. Reserve missiles stowed in hull rear above engine and transmission compartment with access to these via hatches in roof that open each side. Range of the TOW missile depends on model but maximum is 3,750m.

## VARIANTS

Swedish Lvrbv 701 RBS-70 low altitude surface-to-air missile system uses similar chassis to Pvrbv 551s with conversion work also carried out by Hagglund and Soner. This is fitted with a single launcher for the Bofors Missiles RBS-70 laser guided surface-to-air missile.

## STATUS

Production complete. In service with Swedish Army only.

## MANUFACTURER

AB Hagglund and Soner (now Hagglunds Vehicle AB), Omskoldsvik, Sweden.

*flight: Pvrbv 551 anti-tank vehicle with Raytheon Systems Company TOW ATGW launcher raised (FMV)*



# Hagglunds Vehicle BvS 10 APC (Sweden)

## KEY RECOGNITION FEATURES

• The new BvS 10 is similar in appearance to the older Hagglunds Vehicle Bv 206S APC covered in the following entry but is larger

• It consists of two full-tracked units joined together with both units having wide rubber band type tracks. Front unit has six road wheels with last road wheel acting as idler, drive sprocket at front and track return rollers. Rear unit also has six road wheels with return rollers

• Front unit has almost vertical hull front and bonnet that slopes up to the two part windscreen, horizontal roof, vertical sides with two doors in each side, forward one has window in upper part

• Rear unit has vertical front, sides and rear with horizontal roof with one large single door in rear

## SPECIFICATIONS

|                         |                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------|
| Crew:                   | 4+10                                                                                |
| Armament:               | 1 x 7.62mm MG (see text)                                                            |
| Ammunition:             | 1000 x 7.62mm                                                                       |
| Length gun forwards:    | not applicable                                                                      |
| Length hull:            | 7.70m                                                                               |
| Width:                  | 2.10m                                                                               |
| Height:                 | 2.20m                                                                               |
| Ground clearance:       | 0.35m                                                                               |
| Weight, combat:         | 10,500 to 11,500kg                                                                  |
| Weight, empty:          | 7,400kg                                                                             |
| Power-to-weight ratio:  | 23.80hp/tonne                                                                       |
| Ground pressure:        | n/available                                                                         |
| Engine:                 | Cummins 6-cylinder in-line diesel developing 250 hp with growth potential to 300 hp |
| Maximum road speed:     | 65km/h                                                                              |
| Maximum road range:     | 500km                                                                               |
| Fuel capacity:          | n/available                                                                         |
| Fording:                | amphibious                                                                          |
| Vertical obstacle:      | n/available                                                                         |
| Trench:                 | n/available                                                                         |
| Gradient:               | 100%                                                                                |
| Side slope:             | 40%                                                                                 |
| Armour:                 | Steel                                                                               |
| Armour type:            | Classified                                                                          |
| NBC system:             | Optional                                                                            |
| Night vision equipment: | Optional                                                                            |

## DEVELOPMENT

The BvS 10 articulated armoured personnel carrier was developed as a private venture by Hagglunds Vehicles based on their experience in the design, development and production of the earlier and smaller Bv 206 S articulated tracked all terrain vehicle.

The main advantage of the BvS 10 is its larger size which enables it to carry out a wider number of battlefield roles as well as having an increased payload.

The vehicle was shown for the first time in 1998 and in 1999 it was selected by the UK Royal Marines to meet its requirement for an All-Terrain Vehicle (Protected). It is expected that three versions will be acquired, Troop Carrier Vehicle (TCV), Command Post Vehicle (CPV) and Recovery Vehicle (RV).

The BvS 10 consists of two units coupled together by a special articulation system. The powerpack is installed in the front unit which has seats for the driver and three passengers. The rear powered unit has 10 m<sup>2</sup> of cargo space and can carry up to 10 people and their equipment.

The baseline vehicle provides the occupants with protection from 7.62 mm armour piercing attack but higher levels of protection are available.

The BvS 10 is fully amphibious being propelled in the water by its tracks and a wide range of optional equipment is available including winch, air conditioning system, power take off, 300 hp engine and engine pre-heater. A 7.62mm or 12.7mm machine gun can be mounted on the roof of the front unit if required.



#### **VARIANTS**

The BvS 10 is of modular construction enabling it to undertake a wide range of battlefield missions and unit can be modified to accept a wide range of specialist bodies.

#### **STATUS**

Development complete.  
Expected to soon enter production for the British Royal Marines.

#### **MANUFACTURER**

Hagglunds Vehicles,  
Ornskildsvik, Sweden.



*Above: Haggblunds Vehicle BvS 18 armoured personnel carrier*

# Hagglunds Vehicle Bv 206S APC (Sweden)

## KEY RECOGNITION FEATURES

- Unique vehicle consisting of two fully-tracked units joined together. Both units have wide rubber band type tracks
- Front unit has vertical hull front and bonnet that slopes up to the two-part windscreen.
- Front unit has single side door with window above in each side, smaller window to rear. Rear unit normally has two rectangular windows with large door at the back.

## SPECIFICATIONS

|                         |                                                                  |
|-------------------------|------------------------------------------------------------------|
| Crew:                   | 4 + 8                                                            |
| Armament:               | 1 x 12.7mm MG (typical)                                          |
| Length:                 | 6.88m                                                            |
| Width:                  | 2m                                                               |
| Height:                 | 1.9m without armament                                            |
| Ground clearance:       | 0.35m                                                            |
| Weight, combat:         | 7000kg                                                           |
| Weight, empty:          | 5300kg                                                           |
| Power-to-weight ratio:  | 19.42hp/tonne                                                    |
| Engine:                 | Steyr M16 6-cylinder in-line diesel developing 186hp at 4,300rpm |
| Maximum road speed:     | 50km/hr                                                          |
| Maximum road range:     | 370km                                                            |
| Fording:                | Amphibious                                                       |
| Vertical obstacle:      | Not available                                                    |
| Trench:                 | Not available                                                    |
| Gradient:               | 100%                                                             |
| Side slope:             | 60%                                                              |
| Armour:                 | Classified                                                       |
| Armour type:            | Steel                                                            |
| NBC system:             | Optional                                                         |
| Night vision equipment: | Optional                                                         |

## DEVELOPMENT

The Bv206S is the Hagglunds Bv206 all terrain vehicle (of which over 11,000 have been made) fitted with two new all-welded steel bodies to protect the occupants from small arms fire and shell splinters.

The front unit has the engine at the front and seats for the commander and driver in the centre, plus two for passengers in the back. The rear unit has seats for eight people, four down either side. The units are linked by a steering unit. Steering is accomplished by two hydraulic cylinders, servo-controlled from a conventional steering wheel.

The Bv206S is fully amphibious, propelled in the water by its tracks. Before entering the water, a trim vane is erected. A wide range of equipment can be fitted, including an NBC system, winch and night vision aids. A ring-mounted machine gun can be carried on the front unit's roof.

## VARIANTS

The Bv206S can be adapted for use as an ambulance, command post or weapons carrier

## STATUS

In production. In service with Sweden and the UK. Selected by German Army.

## MANUFACTURER

Hagglunds Vehicle AB, Omskoldsvik, Sweden



*Right: BV 206S*

*Below: Bv 206S*

*Below right: Bv 206S*



# FNSS Defense Systems Turkish Infantry Fighting Vehicle (Turkey)

## KEY RECOGNITION FEATURES

- Glacis plate with trim vane at 45° degrees, hull roof horizontal to hull at rear, angled downwards with hull rear sloping inwards
- Driver front left, commander rear, with engine compartment on right. Turret has vertical sides and rear, offset to right of hull. Large ramp in hull rear
- Hull sides vertical with curve to top, upper part of rear troop compartments slopes inwards, two firing ports with vision block above in each side. Suspension has five road wheels, drive sprocket at front, idler in rear. No return track rollers.

## SPECIFICATIONS

|                         |                                                                 |
|-------------------------|-----------------------------------------------------------------|
| Crew:                   | 3+10                                                            |
| Armament:               | 1 x 25mm cannon, 1 x 7.62mm MG, 2 x 3 smoke grenade dischargers |
| Ammunition:             | 230 x 30mm, 1610 x 7.62mm                                       |
| Length:                 | 5.26m                                                           |
| Width:                  | 2.82m                                                           |
| Height:                 | 2.01m (turret roof), 2.62m (hull roof)                          |
| Ground clearance:       | 0.43m                                                           |
| Weight, combat:         | 13,687kg                                                        |
| Power-to-weight ratio:  | 21.91bhp/tonne                                                  |
| Ground pressure:        | 0.67kg/cm <sup>2</sup>                                          |
| Engine:                 | Detroit Diesel Model 6V53T developing 300 hp                    |
| Maximum road speed:     | 68km/hr                                                         |
| Maximum water speed:    | 6.3km/hr                                                        |
| Maximum road range:     | 490km                                                           |
| Fuel capacity:          | 416 lit                                                         |
| Fording:                | Amphibious                                                      |
| Vertical obstacle:      | 0.74m                                                           |
| Trench:                 | 1.83m                                                           |
| Gradient:               | 60%                                                             |
| Side slope:             | 30%                                                             |
| Armour:                 | Classified                                                      |
| Armour type:            | Aluminium/steel                                                 |
| NBC system:             | Optional                                                        |
| Night vision equipment: | Optional                                                        |

## DEVELOPMENT

The Turkish Infantry Fighting Vehicle has been developed by FNSS Defense Systems as a joint venture for the Turkish army. It is based on the United Defense Armored Infantry Fighting Vehicle (qv). A total of 1998 vehicles are being built, of which 650 are the AIFV version fitted with a one-man power-operated turret with a 25mm cannon and 7.62mm co-axial machine gun. The vehicle is fully amphibious, propelled in the water by its tracks. One version of AIFV has French Dragar 25mm turret while other has United Defense 25mm turret.

## VARIANTS

AAPC (Advanced Armored Personnel Carrier) with 12.7mm machine gun turret  
81 mm mortar carrier  
120 mm mortar carrier (private venture from TDA of France  
ATGW carrier (two TOWs in launch position)  
UAE has upgraded versions including engineering squad vehicle, repair/recovery and artillery support.

## STATUS

Production. In service with the Turkish army

## MANUFACTURER

FNSS Defense Systems AS, Ankara, Turkey

## FOLLOWING PAGE:

*Above left: AIFV*

*Above right: Mortar carrier*

*Below left: AAPC*

*Below Right: ATGW carrier*

## TRACKED APCs / WEAPONS CARRIERS



# Alvis Vehicles Warrior Mechanised Combat Vehicle (UK)

| KEY RECOGNITION FEATURES                                                                                                                                                                                                                                       | SPECIFICATIONS          |                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------------------|
|                                                                                                                                                                                                                                                                | Crew:                   | 3+7                                                             |
| • High hull with well sloped glacis plate, driver's hatch in upper left side and louvres to right, horizontal hull top with turret centre, vertical hull rear with stowage boxes each side of single door. No firing ports                                     | Armament:               | 1 x 30mm cannon, 1 x 7.62mm MG, 2 x 4 smoke grenade dischargers |
|                                                                                                                                                                                                                                                                | Ammunition:             | 250 x 30mm, 2,000 x 7.62mm                                      |
|                                                                                                                                                                                                                                                                | Length:                 | 6.34m                                                           |
|                                                                                                                                                                                                                                                                | Width:                  | 3.034m                                                          |
|                                                                                                                                                                                                                                                                | Height:                 | 2.791m (turret roof), 1.93m (hull roof)                         |
|                                                                                                                                                                                                                                                                | Ground clearance:       | 0.49m                                                           |
|                                                                                                                                                                                                                                                                | Weight, combat:         | 28,000kg                                                        |
| • Turret has vertical sides with long barrel 30mm RARDEN cannon with flash eliminator and mounted in external mantlet. Commander and gunner have hatches opening to rear and distinctive roof-mounted periscopes to their front, stowage basket on turret rear | Power-to-weight ratio:  | 19.6bhp/tonne                                                   |
|                                                                                                                                                                                                                                                                | Ground pressure:        | 0.65kg/cm <sup>2</sup>                                          |
|                                                                                                                                                                                                                                                                | Engine:                 | Perkins CVS TCA V-8 diesel developing 550hp at 2,300rpm         |
|                                                                                                                                                                                                                                                                | Maximum road speed:     | 75km/hr                                                         |
|                                                                                                                                                                                                                                                                | Maximum road range:     | 660km                                                           |
|                                                                                                                                                                                                                                                                | Fuel capacity:          | 770 lit                                                         |
|                                                                                                                                                                                                                                                                | Fording:                | 1.3m                                                            |
|                                                                                                                                                                                                                                                                | Vertical obstacle:      | 0.75m                                                           |
|                                                                                                                                                                                                                                                                | Trench:                 | 2.5m                                                            |
|                                                                                                                                                                                                                                                                | Gradient:               | 60%                                                             |
| • Troop compartment at rear has chamfered sides with stowage basket above. Suspension each side has six road wheels, drive sprocket front, idler rear and three track-return rollers covered by skirt                                                          | Side slope:             | 40°/o                                                           |
|                                                                                                                                                                                                                                                                | Armour:                 | Classified                                                      |
|                                                                                                                                                                                                                                                                | Armour type:            | Aluminium (hull), steel (turret)                                |
|                                                                                                                                                                                                                                                                | NBC system:             | Yes                                                             |
|                                                                                                                                                                                                                                                                | Night vision equipment: | Yes (passive for commander, gunner and driver)                  |

## DEVELOPMENT

Warrior (previously known as MCV-80) was developed from mid-1970s by GKN Defence (now Alvis Vehicles) for the British Army. Following prototype trials it was accepted for service in

November 1984 with first production vehicles completed in December 1986. The British Army took delivery of 789 Warrior MCV and variants with final deliveries in 1995.

In 1993 Kuwait placed an order for 254 Desert Warrior vehicles and variants with the first of these being completed in 1994. Desert Warrior has US Delco turret armed with 25mm cannon, 7.62mm coaxial machine gun and a launcher for TOW ATGW either side of turret. It also has a different armour package and an air conditioning system. Kuwaiti variants include command vehicles, repair and recovery and high mobility trailers. For operations in the Middle East the Warrior was fitted with additional passive armour protection.

Driver sits front left with engine to right, two-man turret in centre and troop compartment rear.

## VARIANTS

The British Army has following versions: section vehicle with two-man turret armed with 30mm RARDEN cannon and 7.62mm coaxial MG, command vehicle (three versions, platoon, company and battalion all with same turret as section vehicle but with different communications equipment), Warrior Repair and Recovery Vehicle, Warrior Combat Repair Vehicle, Warrior Mechanised Artillery Observation Vehicle, Battery Command Vehicle (for Royal Artillery) and MILAN ATGW carrier. For export the company is proposing other versions including 105mm light tank, Desert Fighting Vehicle with firing ports, 81mm mortar carrier, fitted with various anti-tank missile systems, anti-aircraft, load carrier, and fitted with other turrets such as 25mm or 90mm. Warrior 2000 is latest export model with Delco 30mm turret fitted.



## TRACKED APCs /WEAPONS CARRIERS



### STATUS

Production complete. In service with Kuwait (Desert Warrior), and UK.

### MANUFACTURER

Alvis Vehicles, Telford, Shropshire, England, UK.

*Above: Warrior MCV  
with applique armour*

*Above right: Desert  
Warrior*

*Far right: Warrior MCV  
(Richard Stickland)*

*Right: Warrior MAOV*





# Alvis FV432 APC (UK)

## KEY RECOGNITION

### FEATURES

- Glacis plate slopes at about 60° with horizontal hull roof extending to rear, vertical hull rear with large door opening left

- Driver front right, engine to his left and machine gunner to his rear, troop compartment rear with four-part circular roof hatch above, two parts opening left and right. Vertical hull sides with exhaust pipe on left side and NBC pack protruding on right side

- Suspension each side has five road wheels, drive sprocket front, idler rear, two track-return rollers. Upper part sometimes covered by skirt

## SPECIFICATIONS

|                                |                                                                                                      |
|--------------------------------|------------------------------------------------------------------------------------------------------|
| Crew:                          | 2+10                                                                                                 |
| Armament:                      | 1 x 7.62mm MG, 2 x 3 smoke <u>grenade dischargers</u>                                                |
| Ammunition:                    | 1,600 x 7.62mm                                                                                       |
| Length:                        | 5.251m                                                                                               |
| Width:                         | 2.8m                                                                                                 |
| <u>Height including MG:</u>    | <u>2.286m</u>                                                                                        |
| <u>Height hull top:</u>        | <u>1.879m</u>                                                                                        |
| Ground clearance:              | 0.406m                                                                                               |
| <u>Weight, combat:</u>         | <u>15,280kg</u>                                                                                      |
| <u>Weight, empty:</u>          | <u>13,740kg</u>                                                                                      |
| <u>Power-to-weight ratio:</u>  | <u>15.7bhp/tonne</u>                                                                                 |
| <u>Ground pressure:</u>        | <u>0.78kg/cm²</u>                                                                                    |
| Engine:                        | Rolls-Royce K60 No 4 Mk 4F<br>2-stroke 6-cylinder multi-fuel<br><u>developing 240bhp at 3,750rpm</u> |
| <u>Maximum road speed:</u>     | <u>52.2km/hr</u>                                                                                     |
| <u>Maximum road range:</u>     | <u>480km</u>                                                                                         |
| <u>Fuel capacity:</u>          | <u>454 lit</u>                                                                                       |
| Fording:                       | 1.066m                                                                                               |
| Vertical obstacle:             | 0.609m                                                                                               |
| Trench:                        | 2.05m                                                                                                |
| Gradient:                      | 60%                                                                                                  |
| <u>Side slope:</u>             | <u>300/0</u>                                                                                         |
| Armour:                        | <u>12mm (maximum)</u>                                                                                |
| <u>Armour type:</u>            | Steel                                                                                                |
| <u>NBC system:</u>             | Yes                                                                                                  |
| <u>Night vision equipment:</u> | <u>Yes (passive for driver)</u>                                                                      |



**Above: FV432 ambulance (Richard Stickland)**

## DEVELOPMENT

FV432 series was developed to meet requirements of British Army in the late 1950s with first prototype completed in 1961. Production undertaken by Sankey, today known as Alvis Vehicles, from 1962 with first production vehicles completed in 1963 and over 3,000 built by production completion in 1972. The FV432 has now been supplemented by the Warrior MCV although the FV432 is expected to remain in service in specialised roles such as mortar, ambulance and signals for many years.

FV432 is all-welded steel with engine front left, driver front right and hatch to his rear, 7.62mm GPMG is normally mounted on roof although some have 7.62mm MG turret. Troops sit on bench seats, five each side facing, and enter via large door in rear. Four-part circular roof hatch over top of troop compartment.

### VARIANTS

Many FV432s have Peak one-man turret mounted above rear troop compartment armed with 7.62mm GPMG.

Ambulance model is unarmed and carries both seated and stretcher patients.

Command, has extensive communications equipment and optional tent erected at rear. Maintenance carrier (FV434) has different hull and crane for removing powerpacks in field.

Mortar carrier has turntable-mounted 81mm mortar in rear firing through roof.

Minelayer, tows Bar minelayer rear. Engineers also use FV432 to tow mine-clearing system such as Giant Viper.

Recovery, has winch mounted in vehicle rear.

Artillery command has Field Artillery Computer Equipment. Royal Artillery also uses it with sound ranging system.

FV432 with Fox turret, training role

FV432 with Cymbeline radar

FV439 is specialised Royal Signals vehicle.

Some of the FV438 Swing-fire ATGW vehicles were converted into Wavell electronics carriers.

### STATUS

Production complete. In service with UK.

### MANUFACTURER

Alvis Vehicles Limited, Telford, Shropshire, England, UK.



*Above: FV439 signal vehicle (Richard Stickland)*

# Alvis Stormer APC (UK)

## KEY RECOGNITION FEATURES

- Blunt nose with sloping glacis plate, driver's position on left side, engine to right, horizontal hull top with vertical hull rear, large door opening right. Sides vertical, chamfer between sides and roof
- Weapon station normally on forward part of roof with hatches to immediate rear
- Suspension each side has six road wheels with drive sprocket front, idler rear, track return rollers which are sometimes covered by skirt

## SPECIFICATIONS

|                               |                                                                                           |
|-------------------------------|-------------------------------------------------------------------------------------------|
| Crew:                         | 3+8                                                                                       |
| Armament:                     | See text                                                                                  |
| Ammunition:                   | Depends on above                                                                          |
| Length:                       | 5.27m                                                                                     |
| Width:                        | 2.4m                                                                                      |
| Width over stowage boxes:     | 2.764m                                                                                    |
| Height with 7.62mm MG:        | 2.27m                                                                                     |
| Ground clearance:             | 0.425m                                                                                    |
| Weight, combat:               | 12,700kg                                                                                  |
| Power-to-weight ratio:        | 19.68bhp/tonne                                                                            |
| Ground pressure:              | 0.40kg/cm <sup>2</sup>                                                                    |
| Engine:                       | Perkins T6/3544 water-cooled 6-cylinder turbocharged diesel developing 250bhp at 2,600rpm |
| Maximum road speed:           | 80km/hr                                                                                   |
| Maximum water speed (tracks): | 5km/hr                                                                                    |
| Maximum road range:           | 650km                                                                                     |
| Fuel capacity:                | 405 lit                                                                                   |
| Fording:                      | 1.1m, amphibious with preparation                                                         |
| Vertical obstacle:            | 0.6m                                                                                      |
| Trench:                       | 1.75m                                                                                     |
| Gradient:                     | 60%                                                                                       |
| Side slope:                   | 35%                                                                                       |
| Armour:                       | Classified                                                                                |
| Armour type:                  | Aluminium                                                                                 |
| NBC system:                   | Optional                                                                                  |
| Night vision equipment:       | Optional                                                                                  |

## DEVELOPMENT

In the 1970s a British Government research and development establishment built FV4333 armoured personnel carrier prototype using components of Alvis Scorpion CVR(T) range. Further development by Alvis resulted in Stormer which entered production in 1981 for export with three sold to USA for evaluation in Light Armored Vehicle (LAV) competition (subsequently won by Diesel Division, General Motors of Canada) and 25 to Malaysia, 12 of which had Helio FVT900 turret, 20mm Oerlikon Contraves cannon and 7.62mm MG and remaining vehicles had Thyssen Henschel TH-1 turret with twin 7.62mm MG. Late in 1986 British Army selected Stormer to mount Shorts Starstreak High Velocity Missile (HVM) system. This has an unmanned turret with a total of eight Starstreak SAM in ready to launch position, four either side.

All versions have similar layout with driver front left, engine compartment right, troop compartment extending right to rear. Wide range of weapon stations for hull top including turrets with 7.62mm and 12.7mm MG, 20mm, 25mm or 30mm cannon up to 76mm or 90mm guns. Wide range of optional equipment including NBC system, night vision devices, flotation screen, firing ports/vision blocks, automatic transmission, land navigation system.

## VARIANTS

Alvis has proposed wide range of roles for Stormer including air defence (with guns or missiles), engineer vehicle, recovery vehicle, ambulance, minelayer, 81mm or 120mm mortar carrier, and command/control.

For Operation Desert Storm, Alvis designed and built a flatbed version of the Stormer to carry the GIAT Minotaur mine scattering system. New version, with Alliant Techsystems

## TRACKED APCs / WEAPONS CARRIERS

Volcano is called the Shielder.

### STATUS

In production. In service with Indonesia, Malaysia, Oman and the UK.

### MANUFACTURER

Alvis Vehicles Limited, Telford, UK.

*Right: Alvis Vehicles  
Stormer APC*

*Below: Alvis Vehicles  
Stormer High Velocity  
Missile System*

*Below right: Alvis Vehicles  
Stormer cargo carrier*



# Alvis Striker SP ATGW Vehicle (UK)

## KEY RECOGNITION FEATURES

- Same hull as Alvis Spartan ARC but with launcher box for five Swingfire ATGWs on roof rear
- Well sloped glacis plate to roof with commander's cupola in front of the Swingfire ATGW launcher box at hull rear
- Suspension has five road wheels, drive sprocket front, idler rear, no track-return rollers

## SPECIFICATIONS

|                         |                                                                                                                                                    |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Crew:                   | 3                                                                                                                                                  |
| Armament:               | Launcher with 5 Swingfire ATGW, 1 x 7.62mm MG, 2 x 4 smoke grenadedischargers                                                                      |
| Ammunition:             | 10 x Swingfire ATGW, 3,000 x 7.62mm                                                                                                                |
| Length:                 | 4.826m                                                                                                                                             |
| Width:                  | 2.28m                                                                                                                                              |
| Height:                 | 2.28m                                                                                                                                              |
| Ground clearance:       | 0.356m                                                                                                                                             |
| Weight, combat:         | 8,346kg                                                                                                                                            |
| Power-to-weight ratio:  | 22.77bhp/tonne                                                                                                                                     |
| Ground pressure:        | 0.345kg/cm <sup>2</sup>                                                                                                                            |
| Engine:                 | Jaguar J60 No 1 Mk 100B 4.2 litre 6-cylinder petrol developing 190hp at 4,750rpm (now being replaced by a Cummins BTA 5.9 diesel developing 190hp) |
| Maximum road speed:     | 80.5km/hr                                                                                                                                          |
| Maximum road range:     | 483km                                                                                                                                              |
| Fuel capacity:          | 350 lit                                                                                                                                            |
| Fording:                | 1.067m                                                                                                                                             |
| Vertical obstacle:      | 0.5m                                                                                                                                               |
| Trench:                 | 2.057m                                                                                                                                             |
| Gradient:               | 60%                                                                                                                                                |
| Side slope:             | 30%                                                                                                                                                |
| Armour:                 | Classified                                                                                                                                         |
| Armour type:            | Aluminium                                                                                                                                          |
| NBC system:             | Yes                                                                                                                                                |
| Night vision equipment: | Yes, commander, gunner and driver                                                                                                                  |

## DEVELOPMENT

Striker was developed to meet requirements of British Army, Alvis being responsible for chassis and the now Matra BAe Dynamics for Swingfire ATGW missile system. First production vehicles delivered in 1975 and used in British Army service by Royal Armoured Corps. Striker (FV102) is member of the Scorpion family Combat Vehicle Reconnaissance (Tracked).

Mounted roof rear is a launcher box for five wire-guided Matra BAe Dynamics Swingfire ATGWs with HEAT warhead and range of 4,000m. They can be launched from inside or outside vehicle with the aid of a separation sight and controller, in day and night conditions. When travelling, launcher box is horizontal but elevated to 35° prior to missile launch. After the five Swingfire ATGWs are fired new missiles must be loaded externally.

The flotation screen on the Alvis Striker has now been removed and the vehicle has been withdrawn from service with the Belgian Army.

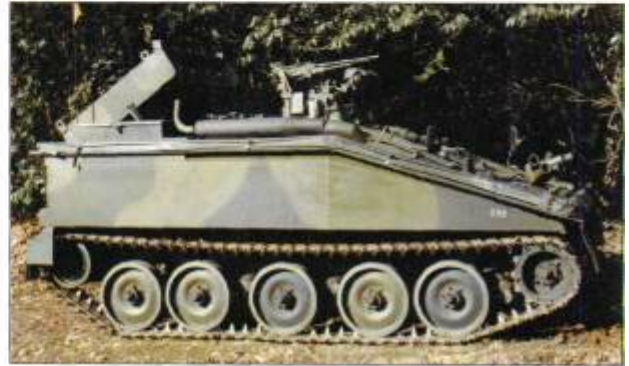
Most of the British Army Alvis Striker vehicles have now been upgraded with the Swingfire Improve Guidance (SWIG) system, the actual missile and chassis have not been upgraded. The British Army did deploy two other systems with the Swingfire ATGW system, the Ferret Mk 5 and the FV438 based on the FV432 chassis, but both of these have been phased out of service.

## VARIANTS

No variants.

## STATUS

Production complete.



#### MANUFACTURER

Alvis Vehicles Limited, Dynamics Division, Coventry, West Midlands, England, UK (chassis), Matra BAe Dynamics, Dynamics Division, Stevenage, Hertfordshire, England, UK (missile system).

*Above: Alvis Striker ATGW vehicle launching Swingfire ATGW*

*Above right: Alvis Striker ATGW vehicle launching Swingfire ATGW*

*Right: Alvis Striker ATGW vehicle with launcher box raised*

# Alvis Spartan APC (UK)

## KEY RECOGNITION FEATURES

- Similar to Stormer but has narrower hull, blunt nose with sloping glacis plate, driver's position on left side with ei jine right, horizontal hull top with vertical hull rear, larger door opening right. Hull sides vertical, chamfer between sides and roof
- Cupola on hull top to rear of driver's position, 7.62mm MG on left side manned by vehicle commander, troop section commander has hatch to right which is flush with roof, two outward-opening roof hatches it ;ir
- Suspension each side has five road wheels, drive sprocket front, idler rear, no return rollers, no skirts

## SPECIFICATIONS

|                         |                                                                                                                                                                                                                             |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Crew:                   | 3+4                                                                                                                                                                                                                         |
| Armament:               | 1 x 7.62mm MG, 2 x 4 smoke grenade dischargers                                                                                                                                                                              |
| Ammunition:             | 3,000 x 7.62mm                                                                                                                                                                                                              |
| Length hull:            | 5.125m                                                                                                                                                                                                                      |
| Width:                  | 2.242m                                                                                                                                                                                                                      |
| Height overall:         | 2.26m                                                                                                                                                                                                                       |
| Ground clearance:       | 0.356m                                                                                                                                                                                                                      |
| Weight, combat:         | 8,172kg                                                                                                                                                                                                                     |
| Power-to-weight ratio:  | 23.25bhp/tonne                                                                                                                                                                                                              |
| Ground pressure:        | 0.338kg/cm <sup>2</sup>                                                                                                                                                                                                     |
| Engine:                 | Jaguar J60 No 1 Mk 100B 4.2 litre 6-cylinder petrol developing 190hp at 4,750rpm (British Army Spartan vehicles are being upgraded with Jaguar petrol engine being replaced by a more fuel efficient Cummins diesel engine) |
| Maximum road speed:     | 80.5km/hr                                                                                                                                                                                                                   |
| Maximum road range:     | 483m                                                                                                                                                                                                                        |
| Fuel capacity:          | 386 lit                                                                                                                                                                                                                     |
| Fording:                | 1.067m, amphibious with preparation                                                                                                                                                                                         |
| Vertical obstacle:      | 0.5m                                                                                                                                                                                                                        |
| Trench:                 | 2.057m                                                                                                                                                                                                                      |
| Gradient:               | 60%                                                                                                                                                                                                                         |
| Side slope:             | 35%                                                                                                                                                                                                                         |
| Armour:                 | Classified                                                                                                                                                                                                                  |
| Armour type:            | Aluminium                                                                                                                                                                                                                   |
| NBC system:             | Yes                                                                                                                                                                                                                         |
| Night vision equipment: | Yes (passive)                                                                                                                                                                                                               |

## DEVELOPMENT

Alvis Spartan (FV103) is a member of Scorpion CVR(T) family and entered service with British Army in 1978 for specialised roles such as carrying Javelin SAM or Royal Engineer assault teams. It is not replacement for FV432 APC (qv).

Driver sits front left, engine compartment to right, vehicle commander/7.62mm MG gunner to his rear and section commander, who dismounts with four infantry, right of vehicle commander. Troops in rear with two-part roof hatch opening left and right, no firing ports. Flotation screen can be fitted round top of hull which, when erected, makes Spartan fully amphibious, propelled by its tracks.

New production vehicles have a number of improvements including upgraded suspension and the option of the more fuel efficient Perkins diesel engine which has already been installed in some export Scorpions. By 1999 total production of the Spartan APC amounted to over 960 vehicles for both home and export market.

## VARIANTS

The British Army did have some Spartans fitted with the twin turret but these have been phased out of service. Spartan can be adopted to take a wide range of other weapons including anti-tank guided missiles and various air defence weapons.

## STATUS

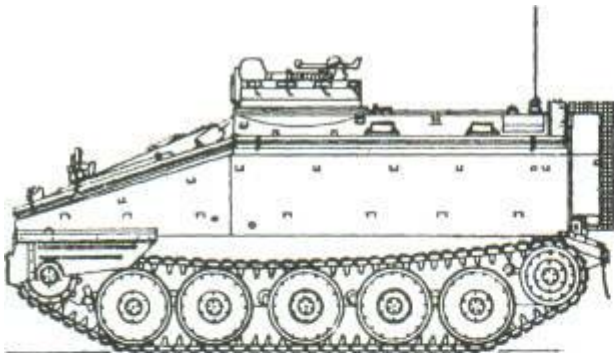
Production as required. In service with Belgium, Oman, UK.

## MANUFACTURER

Alvis Vehicles Limited, Telford, Shropshire, England, UK.



## TRACKED APCs/WEAPONS CARRIERS



*Above left: Alvis Spartan APC*

*Above right: British Army  
Spartan APC (Richard  
Stickland)*



*Left: British Army Spartan  
APC (Richard Stickland)*

# United Defense M2 Bradley IFV (USA)

## KEY RECOGNITION

- High hull line with well sloped glacis plate driver's hatch left side, horizontal hull top, turret centre of roof. Large ramp at hull rear, hatch above rear troop compartment

9 Turret has twin TOW ATGW launcher on left side, extensive external stowage with 25mm cannon front and 7.62mm MG right, two spherical firing ports with periscope above in each side of hull

- Suspension each side has six road wheels, drive sprocket front, idler rear, two track-return rollers. Upper part of track and hull sides has applique armour (when fitted with new armour package firing ports etc are covered up)

## SPECIFICATIONS

|                         |                                                                                                  |
|-------------------------|--------------------------------------------------------------------------------------------------|
| Armament:               | 1 x 25mm cannon, 1 x 7.62mm MG (coaxial), 2 x TOW ATGW launcher, 2 x 4 smoke grenade dischargers |
| Ammunition:             | 900 x 25mm, 2,200 x 7.62mm, 7 x TOW ATGW                                                         |
| Length:                 | 6.55m                                                                                            |
| Width:                  | 3.61m                                                                                            |
| Height gunners sight:   | 2.972m                                                                                           |
| Height turret roof:     | 2.565m                                                                                           |
| Ground clearance:       | 0.432m                                                                                           |
| Weight, combat:         | 22,940kg                                                                                         |
| Weight, empty:          | 19,005kg                                                                                         |
| Power-to-weight ratio:  | 20.38hp/tonne                                                                                    |
| Ground pressure:        | 0.54kg/cm <sup>2</sup>                                                                           |
| Engine:                 | Cummins VTA-903T turbocharged 8-cylinder diesel, SOOHP at 2,600rpm                               |
| Maximum road speed:     | 66km/hr                                                                                          |
| Maximum water speed:    | 7.2km/hr                                                                                         |
| Maximum cruising range: | 483km                                                                                            |
| Fuel capacity:          | 662 lit                                                                                          |
| Fording:                | Amphibious with preparation                                                                      |
| Vertical obstacle:      | 0.914m                                                                                           |
| Trench:                 | 2.54m                                                                                            |
| Gradient:               | 60%                                                                                              |
| Side slope:             | 40%                                                                                              |
| Armour:                 | Classified                                                                                       |
| Armour type:            | Aluminium/laminate/steel                                                                         |
| NBC system:             | Yes                                                                                              |
| Night vision equipment: | Yes (passive for commander, gunner and driver)                                                   |

## M2 Bradley with TOW >N.

## DEVELOPMENT

M2 Bradley is the culmination of an early 1960s programme to provide the US Army with a supplement for M113 ARC. First two prototypes of XM2 were completed by FMC Corporation (now United Defense LP) in 1978. After trials it was standardised as M2 in 1980 with first production vehicles in 1981, when it was named Bradley IFV.

Hull is welded aluminium with additional layer of spaced laminated armour for increased protection. Driver sits front left, engine to his right, troop compartment extending right to rear. Two-man power-operated turret armed with 25mm M242 Chain Gun, 7.62mm M240 MG mounted coaxial to right, turret traverse 360°, weapon elevation from -10° to +60°. Mounted on left side of turret is twin launcher for Raytheon TOW ATGW with range of 3,750m. M2 Bradley is fully amphibious with flotation screen erected (carried collapsed round top of hull).

Later production vehicles are M2A1/M2A2 and M3A1/M3A2 which have many improvements with the A3 models having increased armour protection and upgraded powerpack. Some Bradley vehicles have been fitted with explosive reactive

armour to their turrets and hulls for increased battlefield survivability.

### VARIANTS

M3 Cavalry Fighting Vehicle (CFV) is similar to M2 but has no firing ports, five-man crew and more ammunition.

M7 Bradley FIST, Fire Support Team Vehicle

M6 Bradley Linebacker, TOW ATGW replaced by four Stinger SAM

Ambulance, modified Bradley chassis, no turret

MLRS, based on Bradley chassis with new cabs

XM5, Electronic Fighting Vehicle Systems carrier (MLRS chassis)

M4, Command and Control Vehicle (MLRS chassis)

### STATUS

Production complete. In service with Saudi Arabia and USA.

### MANUFACTURER

United Defense LP, Ground Systems Division, San Jose, California 95108, USA.



*Above: Bradley A3 with applique armour and Commanders Independent Viewer*

# United Defense, LP, Armored IFV (USA)

## KEY RECOGNITION FEATURES

- Glacis plate with trim vane at 45°, hull roof horizontal to hull at rear, angled downwards at 45°, hull rear sloping inwards
- Driver front left, commander rear, engine compartment right, turret with vertical sides and rear offset right of hull. Troop compartment rear with hatch above, large ramp in hull rear
- Hull sides vertical with curve to top, upper part of rear troop compartment slopes inwards, two firing ports with vision block above in each side. Suspension has five road wheels, drive sprocket front, idler rear, no track-return rollers

## SPECIFICATIONS

|                             |                                                                            |
|-----------------------------|----------------------------------------------------------------------------|
| Crew:                       | 3+7                                                                        |
| Armament:                   | 1 x 25mm cannon, 1 x 7.62mm MG (coaxial), 1 x 6 smoke grenade dischargers  |
| Ammunition:                 | 324 x 25mm, 1,840 x 7.62mm                                                 |
| Length:                     | 5.258m                                                                     |
| Width:                      | 2.819m                                                                     |
| Height to top of periscope: | 2.794m                                                                     |
| Height to hull top:         | 2.007m                                                                     |
| Ground clearance:           | 0.432m                                                                     |
| Weight, combat:             | 13,687kg                                                                   |
| Weight, empty:              | 11,405kg                                                                   |
| Power-to-weight ratio:      | 19.29hp/tonne                                                              |
| Ground pressure:            | 0.67kg/cnf                                                                 |
| Engine:                     | Detroit Diesel 6V-53TV-6 liquid cooled diesel developing 264hp at 2,800rpm |
| Maximum road speed:         | 61.2km/hr                                                                  |
| Maximum water speed:        | 6.3km/hr                                                                   |
| Maximum road range:         | 490km                                                                      |
| Fuel capacity:              | 416 lit                                                                    |
| Fording:                    | Amphibious with preparation                                                |
| Vertical obstacle:          | 0.635m                                                                     |
| Trench:                     | 1.625m                                                                     |
| Gradient:                   | 60%                                                                        |
| Side slope:                 | 30%                                                                        |
| Armour:                     | Classified                                                                 |
| Armour type:                | Aluminium/laminate                                                         |
| NBC system:                 | Optional                                                                   |
| Night vision equipment:     | Yes (gunner and driver)                                                    |

## DEVELOPMENT

Armored Infantry Fighting Vehicle was developed as a private venture by former FMC Corporation in the late 1960s, originally named Product Improved M113A1. With further improvements it was renamed AIFV, Netherlands placing initial order for 880 in 1975, followed by Philippines. In 1979 Belgium ordered 514 AIFVs and 525 M113A2s which were produced under licence in Belgium. It is now being manufactured in Turkey by FNSS Defense Systems to meet the requirements of the Turkish Army.

The AIFV has many improvements over M113 series including improved firepower, mobility and armour protection. One-man power-operated turret armed with 25mm KBA cannon, 7.62mm FM MG coaxial to left, turret traverse 360°, weapon elevation from -10° to +50°. AIFV is fully amphibious, propelled by its tracks. Before entering the water a trim vane is erected at front of vehicle.

## VARIANTS

Basic vehicle is designated YPR 765 PRI by Netherlands Army and variants in service include YPR 765 PRCO-B command vehicle, YPR 765 PRCO-C1 to C5 command vehicles, YPR 765 PRDR radar vehicle, YPR 765 PRDR-C radar command vehicle, YPR 765 PRGW ambulance, YPR 765 PRI/I squad vehicle with 12.7mm MG, YPR 765 PRMR mortar tractor towing 120mm mortar, YPR 765 PRVR-A and PRVR-B cargo vehicles, YPR 765 PRAT anti-tank vehicle twin TOW launcher as fitted to US M901 Improved TOW Vehicle, and YPR 806 PRBRG armoured recovery vehicle.

Taiwan also produces a similar vehicle to the AIFV with various weapon installations.

Philippines models are similar to Dutch AIFV but have 12.7mm MG in place of 25mm KBA cannon.

## TRACKED APCs /WEAPONS CARRIERS

Belgian versions include AIFV-B which is similar to Dutch vehicles.

AIFV with 12.7mm cupola weapon station

AIFV-B-CP command post vehicle.

Turkey, there is a separate entry for these vehicles.

### STATUS

Production complete. In service with Bahrain, Belgium, Egypt, Netherlands, Philippines and Turkey.

### MANUFACTURER

United Defense LP, San Jose, California 95108, USA; Belgian Mechanical Fabrication SA, Grace-Hollogne, Belgium; FMC-Nurol, Ankara, Turkey.



*Above right: Armored  
Infantry Fighting Vehicle  
(Richard Stickland)*

*Right: AIFV of Dutch Army  
120mm mortar role  
(Richard Stickland)*

# United Defense M113A2 APC (USA)

## KEY RECOGNITION FEATURES

- Box-shaped hull with front sloping at 60° to rear, horizontal roof, vertical hull rear with large power-operated ramp, vertical hull sides with no firing ports or vision devices
- Driver's circular hatch front left with air louvres to right, commander's cupola with externally mounted 12.7mm M2 HB MG in centre of roof with rectangular hatch to rear. External box-type fuel tanks each side of ramp on hull rear
- Suspension each side has five road wheels, drive sprocket front, idler rear, no track-return rollers, upper part of track normally covered by rubber skirt

## SPECIFICATIONS

|                                |                                                                                                       |
|--------------------------------|-------------------------------------------------------------------------------------------------------|
| Crew:                          | 2+11                                                                                                  |
| Armament:                      | 1 x 12.7mm MG                                                                                         |
| Ammunition:                    | <u>2,000 x 12.7mm</u>                                                                                 |
| <u>Length:</u>                 | 4.863m                                                                                                |
| Width:                         | 2.686m                                                                                                |
| <u>Height overall:</u>         | 2.52m                                                                                                 |
| <u>Height to hull top:</u>     | 1.85m                                                                                                 |
| Ground clearance:              | 0.43m                                                                                                 |
| <u>Weight, combat:</u>         | <u>11,253kg</u>                                                                                       |
| <u>Weight, empty:</u>          | 9,957kg                                                                                               |
| <u>Power-to-weight ratio:</u>  | <u>18.51hp/tonne</u>                                                                                  |
| <u>Ground pressure:</u>        | <u>0.55kg/cm<sup>2</sup></u>                                                                          |
| Engine:                        | Detroit Diesel Model 6V-53,<br>6-cylinder water-cooled diesel<br><u>developing 212bhp at 2,800rpm</u> |
| <u>Maximum road speed:</u>     | <u>60.7km/hr</u>                                                                                      |
| <u>Maximum water speed:</u>    | <u>5.8km/hr</u>                                                                                       |
| <u>Maximum cruising range:</u> | <u>480km</u>                                                                                          |
| <u>Fuel capacity:</u>          | 360 lit                                                                                               |
| <u>Fording:</u>                | <u>Amphibious</u>                                                                                     |
| Vertical obstacle:             | 0.61m                                                                                                 |
| Trench:                        | 1.68m                                                                                                 |
| Gradient:                      |                                                                                                       |
| <u>Side slope:</u>             | 400/0                                                                                                 |
| Armour:                        | <u>44mm (maximum)</u>                                                                                 |
| <u>Armour type:</u>            | Aluminium                                                                                             |
| <u>NBC system:</u>             | <u>Optional</u>                                                                                       |
| <u>Night vision equipment:</u> | <u>Yes (passive or infra-red for driver)</u>                                                          |



***Above: M577 command post***

## DEVELOPMENT

M113 series full tracked APC was developed in late 1950s and first vehicles completed in 1960, powered by petrol engine. M113 was replaced in production by diesel-powered M113A1 in 1964 which in turn was replaced by M113A2 with a number of automotive improvements. Latest model is M113A3 which entered service in 1987 and has many improvements including more powerful engine, spall liners and optional applique armour. By 1999 over 76,000 M113s and its variants had been built, including about 4,500 built in Italy by OTOBREDA. Basic vehicle is fully amphibious, propelled in the water by its tracks. Before entering the water a trim vane is erected at front of hull and bilge pumps switched on.



### VARIANTS

There are countless local modifications of M113, for example Israeli vehicles have additional armour protection and German vehicles have smoke grenade dischargers on hull front and 7.62mm MG in place of standard 12.7mm M2 HB MG. The following list is by no means exhaustive (see separate entries in this section for United Defense Armored Infantry Fighting Vehicle (AIFV) and Italian Infantry Fighting Vehicle):

M113 with dozer blade, M106 107mm mortar carrier, M125 81mm mortar carrier, M113 A/A (Egypt 2 x 23mm), M163 20mm Vulcan air defence system, M548 unarmoured cargo carrier, M577 command post vehicle with higher roof, M113 series recovery vehicle, M901 Improved TOW Vehicle (qv tank destroyers), M981 Fire Support Team Vehicle, M113 with Green Archer radar (Germany).

The Norwegian Army has a number of specialised versions of the M113 series including the NM135 which has a one-man turret armed with a 20mm cannon and a 7.62mm MG and the NM142 which has a one-man Armoured Launching Turret with two TOW ATGW in the ready to launch position. Italy has the SIDAM 4 x 25mm SPAAG on M113 series chassis. Chassis is also used as basis for ADATS air defence system.

M548 used for many specialised vehicles including Chapparral air defence missile system, minelayer (Germany) and electronic warfare carrier.

### STATUS

In production. In service with Argentina, Australia, Belgium, Bolivia, Brazil, Canada, Chile, Costa Rica, Denmark, Ecuador, Egypt, Ethiopia, Germany, Greece, Guatemala, Iran, Israel, Italy, Jordan, Kampuchea, South Korea, Kuwait, Laos,



Lebanon, Libya, Morocco, Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Portugal, Saudi Arabia, Singapore, Somalia, Spain, Sudan, Switzerland, Taiwan, Thailand, Tunisia, Turkey, USA, Uruguay, Vietnam, Yemen and Zaire.

### MANUFACTURER

United Defense Ground Systems Division, San Jose, California, USA. Also built by OTOBREDA in La Spezia, Italy and by BMF in Belgium for Belgian Army.

*Above: Israeli M1 13 with extra armour*



## United Defense M113A2 APC (USA)



*M113A3 APC with add on armour*



*M113 engineer vehicle used by Canada*



*M1064 120mm self-propelled mortar (US Army)*

## TRACKED APCs /WEAPONS CARRIERS



*Left:  
M113A3  
ARC  
without add  
on armour*



*Right:  
Norwegian  
NM135 APC  
with 20mm  
cannon*



*German Army M113 artillery observation vehicle (C R Zwart)*



*Italian Army MI 13 with firing ports (Richard Stickland)*

# M901 Improved TOW Vehicle (USA)

## KEY RECOGNITION FEATURES

- M113 ARC with elevating launcher for two TOW ATGWs on hull roof; when travelling it folds flat on hull top with launcher to rear, when elevated to launch TOWs it has T-shaped profile

- Glacis slopes at 45° with trim vane hinged at bottom, flat hull roof with vertical hull sides and rear, hull has ramp with external fuel tanks each side (did not appear on early vehicles)

- Suspension each side has five road wheels, drive sprocket front, idler rear, no track-return rollers. Upper part of suspension normally covered by rubber skirt

## SPECIFICATIONS

|                           |                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------|
| Crew:                     | 4 or 5                                                                                |
| Armament:                 | 1 x twin TOW ATGW launcher,<br>1 x 7.62mm MG, 2 x 4 smoke<br>grenade dischargers      |
| Ammunition:               | 2+10 TOW ATGW, 1,000 x 7.62mm                                                         |
| Length:                   | 4.83m                                                                                 |
| Width:                    | 2.686m                                                                                |
| Height, launcher erected: | 3.35m                                                                                 |
| Height, travelling:       | 2.91m                                                                                 |
| Weight, combat:           | 11.794kg                                                                              |
| Power-to-weight ratio:    | 18.22hp/tonne                                                                         |
| Ground pressure:          | 0.58kg/cm <sup>2</sup>                                                                |
| Engine:                   | Detroit Diesel model 6V-53,<br>6-cylinder water-cooled developing<br>215bhp@ 2,800rpm |
| Maximum road speed:       | 67.59km/hr                                                                            |
| Maximum water speed:      | 5.8km/hr                                                                              |
| Maximum cruising range:   | 483km                                                                                 |
| Fuel capacity:            | 360 lit                                                                               |
| Fording:                  | Amphibious                                                                            |
| Vertical obstacle:        | 0.61m                                                                                 |
| Trench:                   | 1.68m                                                                                 |
| Gradient:                 | 60%                                                                                   |
| Side slope:               | 300%                                                                                  |
| Armour:                   | 38mm (maximum)                                                                        |
| Armour type:              | Aluminium                                                                             |
| NBC system:               | None                                                                                  |
| Night vision equipment:   | Optional (passive for gunner<br>and driver)                                           |

## DEVELOPMENT

Following trials with prototype systems submitted by three manufacturers, Emerson (now known as Systems Et Electronics Inc) was awarded low rate initial contract in 1976 for M901 Improved TOW Vehicle and by 1995 well over 3,200 had been built for home and export markets. M901 Improved TOW Vehicle (ITV) is essentially M113A2 ARC with roof-mounted launcher for two Raytheon Systems Company TOW ATGWs. Further 10 missiles carried in reserve which are manually loaded via roof hatch to rear of launcher. Latest version of ITV launches all three versions of TOW, Basic TOW, Improved TOW I-TOW and TOW 2; TOW 2 has range of 3,750m. Actual launcher has powered traverse through 360°, elevates from -30° to +34° and can be fitted to wide range of vehicles including Armored Infantry Fighting Vehicle (adopted by Dutch Army), Italian VCC-2 (adopted by Saudi Arabia). Has been installed on a number of chassis for trials, including M41 light tank and LAV-300 (6x6).

## VARIANTS

Fire Support Team Vehicle (FISTV) is M901 but used to locate and designate targets instead of anti-tank capability.

Equipment includes AN/TVQ-2 GLLD with north-seeking gyro and line-of-sight sub-system, AN/TAS-4 sight, land navigation system and extensive communications equipment.

FISTV is designated M981 and entered service with US Army in 1984.

Egyptian version of FISTV is called the Artillery Target Location Vehicle.



## STATUS

Production complete. In service with Egypt (and AIFV chassis), Greece, Jordan, Kuwait, Netherlands (on AIFV chassis), Pakistan, Saudi Arabia (VCC-2 chassis) and Thailand. No longer in service with US Army, US Marine Corps uses same launcher on LAV (8 x 8) chassis.

## MANUFACTURER

Chassis, United Defense LP, San Jose, California, USA. Turret, Systems Et Electronics Inc, St Louis, Missouri, USA.

*Above: M901 ITV launching TOW missile*

*Right: M981 FISTV in operating configuration*



# United Defense LVTP7 AAV (USA)

(now designated AAV7A1 by US Marine Corps)

## KEY RECOGNITION FEATURES

- Boat-shaped hull, nose sloping under forward part of hull to tracks, vertical front with glacis almost horizontal, hull sides vertical to rear of commander's cupola then slope inwards at an angle to troop compartment roof, large ramp at rear
- Suspension has six road wheels, drive sprocket front, idler rear, no track-return rollers, skirt over upper forward part of track
- Driver's cupola front left with commander's cupola rear, MG cupola on right side of hull to rear of engine compartment

## SPECIFICATIONS

|                         |                                                                                                         |
|-------------------------|---------------------------------------------------------------------------------------------------------|
| Crew:                   | 3+25                                                                                                    |
| Armament:               | 1 x 12.7mm MG <sup>*</sup>                                                                              |
| Ammunition:             | 1,000 x 12.7mm <sup>*</sup>                                                                             |
| Length:                 | 7.943m                                                                                                  |
| Width:                  | 3.27m                                                                                                   |
| Height:                 | 3.263m (overall), 3.12m (turret roof)                                                                   |
| Ground clearance:       | 0.406m                                                                                                  |
| Weight, combat:         | 22,838kg                                                                                                |
| Weight, empty:          | 17,441kg                                                                                                |
| Power-to-weight ratio:  | 17.51hp/tonne                                                                                           |
| Engine:                 | Detroit Diesel model 8V-53T, 8-cylinder, water-cooled, turbocharged diesel developing 400hp at 2,800rpm |
| Maximum road speed:     | 64km/hr                                                                                                 |
| Maximum water speed:    | 13.5km/hr (waterjets), 7.2km/hr (tracks)                                                                |
| Maximum road range:     | 482km                                                                                                   |
| Fuel capacity:          | 681 lit                                                                                                 |
| Fording:                | Amphibious                                                                                              |
| Vertical obstacle:      | 0.914m                                                                                                  |
| Trench:                 | 2.438m                                                                                                  |
| Gradient:               | 60%                                                                                                     |
| Side slope:             | 60%                                                                                                     |
| Armour:                 | 45mm (maximum)                                                                                          |
| Armour type:            | Aluminium                                                                                               |
| NBC system:             | None                                                                                                    |
| Might vision equipment: | Yes (for driver only)                                                                                   |

<sup>\*</sup> US vehicles have new turrets with 40mm grenade launcher and 12.7mm MG

## DEVELOPMENT

In the mid-1960s FMC Corporation (now United Defense, LP) was awarded a contract to design and build prototypes of a new armoured amphibious assault vehicle to replace the then current LVTP5 series. First prototypes were completed in September 1967 under the designation LVTPX12 and after trials it was accepted for service as LVTP7 (Landing Vehicle, Tracked, Personnel, Model 7). First production models completed in 1971 and final deliveries in late 1974.

Hull is all-welded aluminium, engine compartment to front right and MG turret to rear. Turret traverses through 360° and 12.7mm MG elevates from -15° to +60°. Driver sits front left with periscope that extends through roof of cupola, commander sits to rear. Troop compartment extends to hull rear with normal means of entry and exit via power-operated ramp in rear, troops and supplies can be loaded via overhead hatches when alongside ship. LVTP7 is fully amphibious, propelled by its tracks or via two waterjets, one each side of hull above idler. Specialised kits include stretcher, navigation, visor and winterisation.

## VARIANTS (excluding prototypes)

LVTC7 (Landing Vehicle, Tracked, Command, Model 7), no MG cupola but extensive communications equipment.  
 LVTR7 (Landing Vehicle, Tracked, Recovery, Model 7), no MG turret but specialised equipment including winch and crane.  
 LVTP7A1 with mine-clearing kit, basic LVTP7A1 with mine-clearance kit inside troop compartment which is raised when required, fires rockets over front of vehicle into minefield. Other types of mine clearance system are being developed including plough.

## TRACKED APCs/WEAPONS CARRIERS



LVTP7A1 with 40mm/12.7mm turret. From 1986/87 many vehicles have been fitted with a new turret called the Upgunned Weapons Station which is armed with a 40mm grenade launcher and a 12.7mm machine gun.

LVTP7A1 is LVTP7 rebuilt, improvements including new Cummins engine, smoke generating capability, passive night vision equipment and improved electric weapon station under Service Life Extension Program (SLEP). In addition to SLEP new vehicles were built to LVTP7A1 standard with final deliveries in 1986 to US Marine Corps and some export customers.

LVTP7A1 with applique armour, some US Marine Corps vehicles have been fitted with the Enhanced Appliance Armor Kit (EAAK) as the replacement for the earlier P900 armour kit.



### STATUS

Production complete. In service with Argentina, Brazil, Italy, South Korea, Spain, Thailand, Venezuela and USA. In US Marine Corps service this will be replaced by the Advanced Amphibious Assault Vehicle under development by General Dynamics/.

### MANUFACTURER

United Defense LP, San Jose, California, USA.

*Above left: LVTP7A1 with 40mm/12.7mm turret*

*Above: AAV7A1 with Upgunned Weapons Station and RAFAEL applique armour*



# United Defense LP Lynx Command and Reconnaissance Vehicle (USA)

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## KEY RECOGNITION FEATURES

- Low profile hull with well sloped glacis plate leading up to horizontal roof, turret mounted in centre of roof with externally mounted 25mm cannon vertical hull sides and rear, access door in hull rear opens to left
- Four road wheels each side, drive sprocket front, idler rear, no track-return rollers, upper part of track covered by rubber side skirts.
- Driver seated front left with radio operator to his right, both with a roof hatch

## SPECIFICATIONS

|                         |                                                                                    |
|-------------------------|------------------------------------------------------------------------------------|
| Crew:                   | 3                                                                                  |
| Armament:               | 1 x 25mm cannon, 2 x 3 smoke grenade launchers                                     |
| Ammunition:             | 200 x 20mm (ready use)                                                             |
| Length:                 | 4.597m                                                                             |
| Width:                  | 2.413m                                                                             |
| Height with armament:   | 2.18m                                                                              |
| Height to hull top:     | 1.651m                                                                             |
| Ground clearance:       | 0.41m                                                                              |
| Weight, combat:         | 8,775kg                                                                            |
| Weight, unloaded:       | 7,725kg                                                                            |
| Power-to-weight ratio:  | 24.5hp/tonne                                                                       |
| Engine:                 | Detroit Diesel 6V-53, 6-cylinder, water-cooled diesel developing 215hp at 2,800rpm |
| Maximum road speed:     | 70.8km/hr                                                                          |
| Maximum water speed:    | 6.6km/hr                                                                           |
| Range (cruising):       | 523km                                                                              |
| Fuel capacity:          | 303 lit                                                                            |
| Fording:                | Amphibious                                                                         |
| Vertical obstacle:      | 0.609m                                                                             |
| Trench:                 | 1.474m                                                                             |
| Gradient:               | 60%                                                                                |
| Side slope:             | 30%                                                                                |
| Armour:                 | 12-38mm (estimate)                                                                 |
| Armour type:            | Aluminium                                                                          |
| NBC system:             | None                                                                               |
| Night vision equipment: | Yes (infra-red for driver)                                                         |

## DEVELOPMENT

The command and reconnaissance vehicle was developed as a private venture by FMC corporation (now United Defense, LP) and uses automotive components of Mil 3 APC built by the same company. First prototype was completed in 1963 but it was not adopted by the US Army. The Canadian Armed Forces purchased 174, which they call Lynx, the first production vehicles being completed in 1968. The Netherlands ordered 250, the first of these completed in 1966.

The vehicles used by the Canadian armed forces have been phased out of service. The vehicle remains in service with the Royal Netherlands Army although these are expected to be replaced by the Fenneck (qv).

The Royal Netherlands Army vehicles are fitted with an Oerlikon-Contraves GBD-AOA turret armed with an externally mounted 25mm cannon. Turret traverse is manual through 360 degrees with weapon elevation from -12 to +52 degrees. The 25mm cannon is dual feed.

The vehicle, which is sometimes called in Lynx in Canadian service, is fully amphibious being propelled in the water by its tracks. Before entering the water a trim vane is erected at the front of the vehicle, bilge pumps are switched on and a set of rectangular covers are erected round the air inlet and exhaust outlets on the top of the hull.

A wide range of optional equipment was offered for the vehicle including NBC detection and alarm system, different armament installations, windscreen and a capstan winch.

## VARIANTS

There are no variants in service.





*Above: Dutch Army vehicle with 25mm one-man turret (C R Zwart)*

*Right: Dutch Army vehicle with 25mm one-man turret (Michael Jerchel)*



#### **STATUS**

Production complete. In service only with the Netherlands.

#### **MANUFACTURER**

United Defense, LP, San Jose, California, USA.

# M-60P APC (Yugoslavia)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with hatches for driver and assistant driver in upper part, cupola with externally mounted 12.7mm M2 HB MG on right side of hull, commander's cupola opposite
- Troop compartment has vertical sides with top half sloping inwards, vertical hull rear with two doors
- Suspension extends each side of hull with five road wheels, drive sprocket front, idler rear, three track-return rollers. Upper part of track covered by skirt

## SPECIFICATIONS

|                         |                                                               |
|-------------------------|---------------------------------------------------------------|
| Crew:                   | 3+10                                                          |
| Armament:               | 1 x 12.7mm MG (AA),<br>1 x 7.92mm MG (bow)                    |
| Length:                 | 5.02m                                                         |
| Width:                  | 2.77m                                                         |
| Height:                 | 2.385m (with 12.7mm MG),<br>1.86m (without armament)          |
| Ground clearance:       | 0.4m                                                          |
| Weight, combat:         | 11,000kg                                                      |
| Power-to-weight ratio:  | 12.73hp/tonne                                                 |
| Ground pressure:        | 0.7kg/cm <sup>2</sup>                                         |
| Engine:                 | FAMOS 6-cylinder in-line water-cooled diesel developing 140hp |
| Maximum road speed:     | 45km/hr                                                       |
| Maximum road range:     | 400km                                                         |
| Fuel capacity:          | 150 lit                                                       |
| Fording:                | 1.35m (still water),<br>1.25m (running water)                 |
| Vertical obstacle:      | 0.6m                                                          |
| Trench:                 | 2m                                                            |
| Gradient:               | 60%                                                           |
| Side slope:             | 400/o                                                         |
| Armour:                 | 25mm (maximum)                                                |
| Armour type:            | Steel                                                         |
| NBC system:             | None                                                          |
| Night vision equipment: | Yes (infra-red for driver)                                    |

## DEVELOPMENT

M-60P was developed to meet requirements of Yugoslav Army in late 1960s and made first appearance during parade in 1965. For a short period it was also referred to as M-590. Driver sits front left with co-driver to his right (who also operates bow mounted 7.92mm MG), engine and transmission below. Commander's cupola is to rear of driver and protrudes slightly over left side of hull, with similar machine gunner's cupola on opposite side. 12.7mm M2 HB MG can be used both in anti-aircraft and ground-to-ground roles, no provision for firing from inside vehicle. 12.7mm M2 HB MG can be dismantled and used in ground role.

The troop compartment is at the rear and infantry enter and leave via two doors in rear, each of which has firing/observation port. Three firing/observation ports in each side of troop compartment. M-60P has no amphibious capability but board mounted on glacis plate deflects water rushing up glacis plate when fording.

## VARIANTS

Only known variant is M-60PB anti-tank which has twin 82mm recoilless rifles mounted on top left or top right of hull at rear, elevation of +6°, depression of -4°, traverse and elevation both manual. Ten 82mm HEAT projectiles are carried.

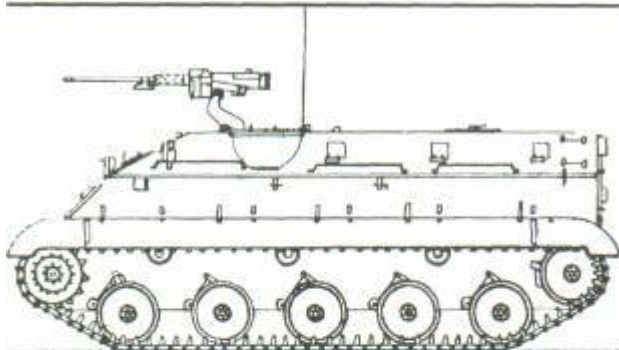
Other versions of M-60P are probably in service, such as ambulance, command and radio vehicles.

## STATUS

Production complete. In service with Yugoslavia.

## MANUFACTURER

Croatian and Yugoslavia state factories.



*Above left: M-60P with 12.7mm MG  
Left: M-60P with 12.7mm MG  
Top: Infantry dismount from M-60P  
Above: M-60P with 12.7mm MG*

# BVP M80A Infantry Combat Vehicle (Yugoslavia)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate leads up to hull top which is horizontal all way to rear, vertical back with hull sides above track sloping inwards, two doors in hull rear
- Circular turret with sloping sides slightly to rear of vehicle centre, 20mm cannon in front and twin launcher for Sagger ATGW externally at rear
- Suspension has five road wheels, drive sprocket front, idler rear, two track-return rollers. Rollers and upper part of track covered by sheet metal skirt

## SPECIFICATIONS

|                         |                                                                                        |
|-------------------------|----------------------------------------------------------------------------------------|
| Crew:                   | 3+7                                                                                    |
| Armament:               | 1 x 20mm cannon, 1 x 7.62mm MG (coaxial), 2 x Sagger ATGW                              |
| Ammunition:             | 1,400 x 20mm, 2,000 x 7.62mm, 4 Sagger ATGW                                            |
| Length:                 | 6.42m                                                                                  |
| Width:                  | 2.995m                                                                                 |
| Height:                 | 2.67m (with ATGW)                                                                      |
| Ground clearance:       | 0.4m                                                                                   |
| Weight, combat:         | 14,000kg                                                                               |
| Power-to-weight ratio:  | 22.5hp/tonne                                                                           |
| Ground pressure:        | 0.67kg/cm <sup>2</sup>                                                                 |
| Engine:                 | FAMOS 10V003 4-stroke 10-cylinder direct-injection diesel developing 315hp at 2,500rpm |
| Maximum road speed:     | 64km/hr                                                                                |
| Maximum water speed:    | 7.8km/hr                                                                               |
| Maximum road range:     | 500km                                                                                  |
| Fuel capacity:          | 510 lit                                                                                |
| Fording:                | Amphibious                                                                             |
| Vertical obstacle:      | 0.8m                                                                                   |
| Trench:                 | 2.4m                                                                                   |
| Gradient:               | 60%                                                                                    |
| Side slope:             | 40°/o                                                                                  |
| Armour:                 | Classified                                                                             |
| Armour type:            | Steel                                                                                  |
| NBC system:             | Yes                                                                                    |
| Night vision equipment: | Yes (commander, gunner and driver)                                                     |

## DEVELOPMENT

The BVP M80A is a further development of M-80 and was seen in public for the first time during a military exhibition in Cairo in late 1984. Main improvement over M-80 is a more powerful engine which gives slightly higher speed and higher power-to-weight ratio.

Overall layout is very similar to earlier M-80 with driver front left, vehicle commander to his rear, engine compartment front right, turret centre and infantry compartment rear. Infantry sit back to back along centre of vehicle, enter and leave via two doors in hull rear each of which has firing port and vision block. In each side of personnel compartment are a further three firing ports with periscope above for aiming. Over top of troop compartment are two oval roof hatches. One-man turret traverses through 360°. 20mm cannon and 7.62mm MG mounted coaxially right elevate from -5° to +75° under power control, with manual controls provided for emergency use. Twin launcher for Sagger-type wire-guided anti-tank missiles mounted on turret rear (launched from inside turret).

The BVP M80A is fully amphibious, propelled by its tracks. Before entering the water a trim vane is erected on glacis plate and bilge pumps switched on. Engine compartment fire suppression system fitted as standard. Vehicle lays its own smoke screen by injecting diesel fuel into exhaust.

## VARIANTS

BVP M80AK, new one-man turret armed with 30mm cannon, 7.62mm coaxial MG and twin launcher for Yugoslav built Sagger ATGW.

BVP M80A1, two-man turret armed with twin 30mm anti-aircraft cannon, prototype only.

BVP M80A KC, company commander's vehicle.

BVP M80A KB, battalion commander's vehicle.

BVP M80ALT anti-tank, new turret with six Sagger ATGW in ready-to-launch position.

BVP M80A Sn, ambulance, has no turret.

SAVA low altitude SAM system.

### STATUS

Production complete. In service with Bosnia, Croatia, Macedonia, Slovenia and Yugoslavia.

### MANUFACTURER

Former Yugoslav state factories.

***Right: BVP M80AK which has 30mm cannon***



# M-80 Mechanised ICV (Yugoslavia)

## KEY RECOGNITION FEATURES

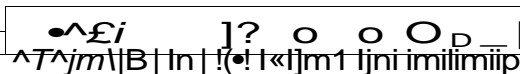
- Well sloped glacis plate with trim vane folded back on lower part, horizontal hull top to rear, hull rear slopes slightly inwards with two doors that open on outside

- Circular turret with sloping sides slightly to rear of vehicle centre with 20mm cannon in front, 7.62mm MG coaxial to right, twin launcher for Sagger ATGW right rear

- Suspension has five road wheels, drive sprocket front, idler rear, two track-return rollers. Rollers and upper part of track covered by sheet metal skirt. Hull sides at rear slope inwards, firing ports in sides and periscopes above

## SPECIFICATIONS

|                         |                                                                     |
|-------------------------|---------------------------------------------------------------------|
| Crew:                   | 3+7                                                                 |
| Armament:               | 1 x 20mm, 1 x 7.62mm MG (coaxial), twin launcher for Sagger ATGW    |
| Ammunition:             | 400 x 20mm, 2,250 x 7.62mm, 4 x Sagger ATGW                         |
| Length:                 | 6.4m                                                                |
| Width:                  | 2.59m                                                               |
| Height over ATGW:       | 2.5m                                                                |
| Height over turret:     | 2.3m                                                                |
| Height hull roof:       | 1.8m                                                                |
| Ground clearance:       | 0.4m                                                                |
| Weight, combat:         | 13,600kg                                                            |
| Weight, empty:          | 11,700kg                                                            |
| Power-to-weight ratio:  | 18.97hp/tonne                                                       |
| Ground pressure:        | 0.64kg/cm <sup>2</sup>                                              |
| Engine:                 | HS 115-2 V-8 water-cooled turbo diesel developing 260hp at 3,000rpm |
| Maximum road speed:     | 60km/hr                                                             |
| Maximum water speed:    | 7.5km/hr                                                            |
| Maximum road range:     | 500km                                                               |
| Fuel capacity:          | Not available                                                       |
| Fording:                | Amphibious                                                          |
| Vertical obstacle:      | 0.8m                                                                |
| Trench:                 | 2.2m                                                                |
| Gradient:               | 60%                                                                 |
| Side slope:             | 30%                                                                 |
| Armour:                 | 30mm (maximum) (estimate)                                           |
| Armour type:            | Steel                                                               |
| NBC system:             | Yes                                                                 |
| Night vision equipment: | Yes (infra-red for commander, gunner, driver)                       |



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## DEVELOPMENT

M-80 was developed in the early 1970s and seen in public for the first time in May 1975. The vehicle was originally referred to by the Yugoslavs as the M-980, but this was subsequently changed to the M-80. Driver sits front left with commander to his rear, engine compartment to right. Turret is in centre with 20mm cannon and 7.62mm coaxial MG which elevates from -5° to +75°, turret traverses 360°. Mounted externally on right side of turret at rear is launcher with two Sagger-type wire-guided ATGWs which have maximum range of 3,000m. Troop compartment is at rear, three men sit each side back to back, each with firing port and periscope above. Two roof hatches above troop compartment with periscope above. Over top of troop compartment are two roof hatches hinged in centre. M-80 is fully amphibious, propelled by its tracks. Before entering the water the trim vane is erected and bilge pumps switched on.

## VARIANTS

No known variants.

**STATUS**

Production complete. In service with Bosnia, Croatia, Macedonia, Slovenia and Yugoslavia. Succeeded in production by BVP M80A (qv).

**MANUFACTURER**

Former Yugoslav state arsenals.

*Right: M-SO*







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# **4x4 VEHICLES**

# Tenix S600 APC (Australia)

## KEY RECOGNITION FEATURES

- Vertical hull front with bonnet sloping upwards to two part windscreen which slopes slightly to the rear. Horizontal roof and vertical rear with two part hatch, the upper part opens upwards and the lower part opens downwards to form a step

- The upper and lower parts of the hull sides slope inwards with the wheels being at either end of the vehicle. In each side of the hull is a large window to the front and a single side door, the upper part opens upwards and the lower part opens downwards to form a step

- Two spare wheels are normally carried one either side at the rear and a 7.62mm or 12.7mm machine gun is normally mounted on the roof. There is a distinct air intake tube on the front right side of the hull

## SPECIFICATIONS

|                         |                                                                                                     |
|-------------------------|-----------------------------------------------------------------------------------------------------|
| Crew:                   | 1 + 11                                                                                              |
| Armament:               | 1 x 12.7mm MG (typical)                                                                             |
| Ammunition:             | 1000 x 12.7mm MG (typical)                                                                          |
| Length hull:            | 5.76m                                                                                               |
| Width:                  | 2.95m                                                                                               |
| Height:                 | 2.70m                                                                                               |
| Ground clearance:       | 0.44m                                                                                               |
| Weight, combat:         | 12,500kg                                                                                            |
| Power-to-weight ratio:  | 17.1hp/tonne                                                                                        |
| Ground pressure:        | Not available                                                                                       |
| Engine:                 | Mercedes-Benz 6-cylinder in-line turbo-charged and inter-cooled diesel developing 214hp at 2,600rpm |
| Maximum road speed:     | 110km/h                                                                                             |
| Maximum road range:     | 1,000km                                                                                             |
| Fuel capacity:          | 320litres                                                                                           |
| Fording:                | 1.20m                                                                                               |
| Vertical obstacle:      | 0.5m                                                                                                |
| Trench:                 | Not available                                                                                       |
| Gradient:               | 75%                                                                                                 |
| Side slope:             | 58%                                                                                                 |
| Armour:                 | Classified                                                                                          |
| Armour type:            | Steel                                                                                               |
| NBC system:             | No                                                                                                  |
| Night vision equipment: | Optional                                                                                            |

## DEVELOPMENT

The S600 was originally developed by Shorts of Northern Ireland and was first revealed in September 1995. The design, sales and marketing rights were subsequently sold to British Aerospace Australia who eventually sold their complete range

of 4 x 4 light armoured vehicles, including the S600, to Tenix Defence Systems also of Australia.

The first customer for the S600 was the Kuwait National Guard who ordered 22 vehicles which were delivered between 1998 and 1999.

The S600 is based on a Mercedes-Benz Unimog (4 x 4) truck chassis for which parts are available all over the world. The body provides the occupants with protection from small arms fire, shell splinters and small mines.

The powerpack is at the front of the vehicle with the remainder being taken up by the troop compartment. The commander and driver are seated at the front with the troops being seated on bench seats that run down either side of the hull at the rear. Various types of light weapons can be mounted on the roof such as 7.62mm or 12.7mm machine guns or a 40 mm automatic grenade launcher.

A wide range of optional equipment can be provided such as front mounted winch, applique armour, grenade launchers, land navigation system, central tyre pressure regulation system, heater, fire detection and suppression system and night vision equipment. Different roof hatches and seating arrangements are also possible.

## VARIANTS

Barricade removal vehicle, ambulance, 81mm mortar, command post, surveillance vehicle and airport security vehicle.

## STATUS

Production as required. In service with Kuwait.

## MANUFACTURER

Tenix Defence Systems, Victoria, Australia.



*Above: Tenix S600 APC without armament*

# ADI Bushmaster APC (Australia)

## KEY RECOGNITION FEATURES

- Box shaped hull with vertical front with horizontal louvres, bonnet slopes gently up to large one piece windscreen which slopes well to rear, horizontal roof extends to vertical hull rear
- Hull sides are vertical with distinct step above road wheels. Large side window towards front and three smaller ones to rear. Mounted on either side of hull at rear is a replacement wheel and tyre
- Single circular roof hatch over forward part of roof on which a 7.62mm MG or similar weapon can be mounted, four rectangular roof hatches over rear troop compartment

## SPECIFICATIONS

|                         |                                                                      |
|-------------------------|----------------------------------------------------------------------|
| Crew:                   | 2 + 7                                                                |
| Armament:               | 1 x 7.62mm MG (typical)                                              |
| Ammunition:             | 1000 rounds (typical)                                                |
| Length:                 | 7.02m                                                                |
| Width:                  | 2.50m                                                                |
| Height:                 | 2.65m                                                                |
| Ground clearance:       | 0.47m                                                                |
| Weight, combat:         | 14,000kg                                                             |
| Weight, empty:          | 11,300kg                                                             |
| Power-to-weight ratio:  | 21.42hp/tonne                                                        |
| Ground pressure:        | Not available                                                        |
| Engine:                 | Caterpillar 3126 ATAAC 6-cylinder diesel developing 300hp at 2400rpm |
| Maximum road speed:     | 120km/h                                                              |
| Maximum road range:     | 1000km                                                               |
| Fuel capacity:          | 385l                                                                 |
| Fording:                | 1.20m                                                                |
| Vertical obstacle:      | 0.44m                                                                |
| Trench:                 | n/available                                                          |
| Gradient:               | 60%                                                                  |
| Side slope:             | 40°/o                                                                |
| Armour:                 | Classified                                                           |
| Armour type:            | Steel                                                                |
| NBC system:             | No                                                                   |
| Night vision equipment: | No                                                                   |

## DEVELOPMENT

Following an international competition, in early 1999 the Australian Army placed a contract with ADI for the supply of 340 Infantry Mobility Vehicles (IMV) and first production vehicles are expected to be delivered in the year 2000.

The hull of the Bushmaster is of all welded steel armour which provides the occupants with protection from small arms fire, shell splinters and mines. The powerpack, consisting of a diesel engine coupled to a fully automatic transmission, is mounted at the front of the vehicle with the driver and commander to the rear.

The infantry are seated on individual seats that run down each side of the hull rear facing inwards. Entry is via a large door in the hull rear. The troop compartment is provided with seven large bullet proof windows, three each side and one in the rear door, each of these windows has a firing port.

Standard equipment includes power steering, air conditioning system, cooled water supply system and hydraulically operated 10 tonne winch. A 7.62mm or 5.56mm machine gun can be mounted on the roof of the vehicle above the commander's and driver's positions.

## VARIANTS

Projected variants include:-  
Ambulance

Command post  
Mortar carrier

Direct fire weapons  
Repair (fitters)  
Engineer (assault pioneer)

*OPPOSITE PAGE:*

*Top left:*  
*Bushmaster IMV*

*Top right:*  
*Bushmaster IMV*

*Bottom left:*  
*Bushmaster IMV*

*Bottom right:*  
*Bushmaster IMV*

## STATUS

Entering production for the  
Australian Army and A,r Force.

## MANUFACTURER

ADI Limited, Bendigo, Australia.





# BDX APC (Belgium)

## KEY RECOGNITION FEATURES

- Box-type hull, sloping glacis plate with large bullet-proof window in front of driver with smaller window each side
- Lower hull sides vertical with door between roadwheels, upper part of hull slopes inwards, vertical hull rear with door opening to right
- Horizontal roof with armament mounted centre, exhaust pipe and silencer mounted on each side of upper part of hull sides

## SPECIFICATIONS

|                         |                                                                |
|-------------------------|----------------------------------------------------------------|
| Crew:                   | 2+10                                                           |
| Configuration:          | 4x4                                                            |
| Armament:               | Seetext                                                        |
| Length:                 | 5.05m                                                          |
| Width:                  | 2.5m                                                           |
| Height with turret:     | 2.84m                                                          |
| Height to hull top:     | 2.06m                                                          |
| Ground clearance:       | 0.4m                                                           |
| Wheelbase:              | 3.003m                                                         |
| Weight, combat:         | 10,700kg                                                       |
| Weight, unloaded:       | 9,750kg                                                        |
| Power-to-weight ratio:  | 16.82hp/tonne                                                  |
| Engine:                 | Chrysler V-8 water-cooled petrol developing 180bhp at 4,000rpm |
| Maximum road speed:     | 100km/hr                                                       |
| Maximum road range:     | 500 to 900km                                                   |
| Fuel capacity:          | 248 lit                                                        |
| Fording:                | Amphibious                                                     |
| Vertical obstacle:      | 0.4m                                                           |
| Trench:                 | Not applicable                                                 |
| Gradient:               | 60%                                                            |
| Side slope:             | 40%                                                            |
| Armour type:            | Steel                                                          |
| Armour:                 | 12.7mm (maximum)                                               |
| NBC system:             | Optional                                                       |
| Night vision equipment: | Optional                                                       |

## DEVELOPMENT

In 1976 the Engineering Division of Beherman Demoen obtained a licence to produce an improved version of the Irish Timoney (4x4) APC. In 1977 the Belgian Government ordered

123 vehicles, 43 for the Belgian Air Force for airfield protection and 80 for the Belgian gendarmerie, delivered between 1978 and 1981. Five vehicles were also delivered to Argentina, and more recently most of the Belgian vehicles have been transferred to Mexico. Further development of BDX resulted in the Vickers Defence Systems Valkyr, only two of these were sold to Kuwait before the Iraqi invasion.

The driver sits far front with engine to rear. Behind this is troop compartment with entry doors sides and rear. Variety of weapons can be mounted on roof including turret with twin 7.62mm MGs or turret with twin MILAN ATGWs in ready-to-launch position.

The BDX is fully amphibious, propelled by its wheels. Waterjets, NBC system, smoke grenade dischargers, air-conditioning system and front-mounted dozer blade available as optional extras. As an option the petrol engine fitted to all production vehicles could be replaced by the more fuel efficient Detroit Diesel Model 4V-53T developing 180hp at 2,800rpm.

## VARIANTS

Gendarmerie order comprised 41 APCs without turret, 26 with dozer blade and 13 81mm mortar carriers.

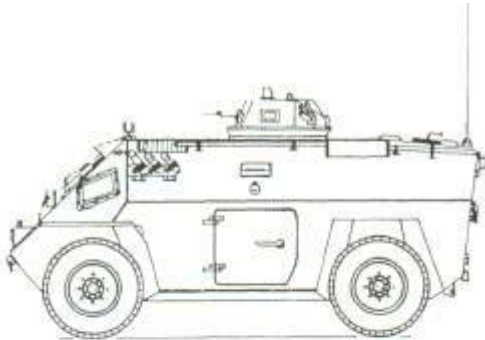
Technology Investments built 10 Timoney APCs for Irish Army, five Mk 4s and five Mk 6s.

## STATUS

Production complete. In service with Argentina, Belgium and Mexico.

## MANUFACTURER

Beherman Demoen Engineering (BDX), Mechelen, Belgium.



Top left: BOX with twin 7.62mm turret  
Above: BOX with twin 7.62mm MG turret  
Left: BOX without armament



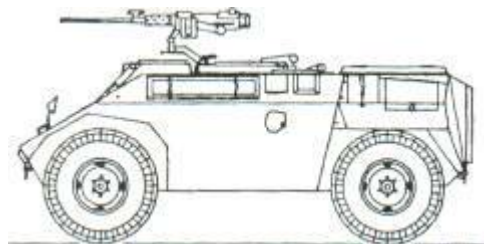
# ENGESA EE-3 Jararaca Scout Car (Brazil)

## KEY RECOGNITION FEATURES

- Nose slopes back under hull front headlamps recessed, well sloped glacis plate with horizontal roof line, driver's position protruding from roof line over glacis plate
- Armament normally mounted on top of hull in centre (offset to right), engine rear, air louvres in vertical hull rear
- Vertical hull sides with chamfer between hull sides and roof, door in right hull side on late production models, two road wheels each side at extreme ends of vehicle

## SPECIFICATIONS

|                                                |                                                                                                              |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Crew:                                          |                                                                                                              |
| Configuration:                                 | 4x4                                                                                                          |
| Armament:                                      | 1 x 12.7mm MG                                                                                                |
| Ammunition:                                    | 1000 x 12.7mm                                                                                                |
| <u>Length:</u>                                 | 4.163m                                                                                                       |
| <u>Width:</u>                                  | 2.235m                                                                                                       |
| <u>Height</u><br><u>(top of 12.7mm mount):</u> | 2.3m                                                                                                         |
| <u>Height (hull top):</u>                      | 1.56m                                                                                                        |
| <u>Ground clearance:</u>                       | 0.335m                                                                                                       |
| <u>Wheelbase:</u>                              | 2.6m                                                                                                         |
| <u>Weight, combat:</u>                         | 5,800kg                                                                                                      |
| <u>Power-to-weight ratio:</u>                  | 20.7hp/tonne                                                                                                 |
| Engine:                                        | Mercedes-Benz OM 314A<br>turbocharged, 4-cylinder water-cooled diesel developing<br><u>120hp at 2,800rpm</u> |
| <u>Maximum road speed:</u>                     | 100km/hr                                                                                                     |
| <u>Maximum road range:</u>                     | 700km                                                                                                        |
| <u>Fuel capacity:</u>                          | 140 lit                                                                                                      |
| <u>Fording:</u>                                | 0.6m                                                                                                         |
| <u>Vertical obstacle:</u>                      | 0.4m                                                                                                         |
| <u>Trench:</u>                                 | <u>Not applicable</u>                                                                                        |
| <u>Gradient:</u>                               | 60°o                                                                                                         |
| <u>Side slope:</u>                             | 30°o/o                                                                                                       |
| <u>Armour:</u>                                 | Classified                                                                                                   |
| <u>Armour type:</u>                            | <u>Steel (2 layers)</u>                                                                                      |
| <u>NBC system:</u>                             | <u>Optional</u>                                                                                              |
| <u>Night vision equipment:</u>                 | <u>Optional</u>                                                                                              |



## DEVELOPMENT

EE-3 Jararaca (4x4) was designed by ENGESA to complement its EE-9 (6x6) Cascavel armoured car and EE-11 Urutu (6x6) armoured personnel carrier. Like other ENGESA wheeled armoured vehicles the Jararaca has proven and common automotive components wherever possible. The driver sits front with machine gunner to his right rear and vehicle commander, who also operates communications equipment, to left rear. All three crew members have roof hatches and there is a large forward-opening door in the right side of the hull. Standard equipment included central tyre pressure regulation system that allows driver to adjust tyre pressure to suit ground, and run flat tyres. Optional equipment includes smoke grenade dischargers, passive night vision equipment, NBC system, radios and intercom.

A wide range of armament could be installed on the roof including a pintle-mounted Euromissile MILAN ATGW system, and the standard 12.7mm M2 HB MG can be replaced by a 7.62mm MG or a 20mm cannon. Other armament installations include a 60mm breech-loaded mortar, ENGESA ET-MD one-man turret armed with one 20mm cannon and one 7.62mm MG

#### **VARIANTS**

Apart from the different armament options the only known variant is the NBC reconnaissance version with raised roof and NBC monitoring equipment.

#### **STATUS**

Production complete. In service with Cyprus, Equador, Gabon and Uruguay.

#### **MANUFACTURER**

ENGESA, Sao Jose dos Campos, Brazil. This company is no longer in existence.



*Right: ENGESA EE 3*

# RH ALAN LOV APC (Croatia)

## KEY RECOGNITION FEATURES

- Boxed shaped hull with radiator louvres under nose of vehicle with glacis plate sloping up to horizontal roof that extends to the rear. Raised drivers compartment at front left with window to front and small window to sides
- Weapon station normally mounted in centre of hull roof with two roof hatches to rear. Vertical hull rear which often has a spare wheel and tyre fitted
- Upper part of hull sides slope inwards as does lower part of hull with wheels at ends of vehicle. There is a forward opening door in each side of the hull just forward of the front road wheel

## SPECIFICATIONS

|                         |                                                                   |
|-------------------------|-------------------------------------------------------------------|
| Crew:                   | 2+10                                                              |
| Armament:               | 1 x 12.7mm MG                                                     |
| Ammunition:             | 1000 x 12.7mm                                                     |
| Length:                 | 5.89m                                                             |
| Width:                  | 2.39m                                                             |
| Height:                 | 1.98m (hull top)                                                  |
| Ground clearance:       | 0.315m                                                            |
| Weight, combat:         | 8200kg                                                            |
| Weight, empty:          | 7200kg                                                            |
| Power-to-weight ratio:  | 15.85hp/tonne                                                     |
| Ground pressure:        | Not available                                                     |
| Engine:                 | Deutz BT6L 91 2S turbocharged diesel developing 130 hp at 2650rpm |
| Maximum road speed:     | 100/1 20km/h                                                      |
| Maximum road range:     | 500/700km                                                         |
| Fuel capacity:          | 170l                                                              |
| Fording:                | 1m                                                                |
| Vertical obstacle:      | 0.50m                                                             |
| Trench:                 | Not available                                                     |
| Gradient:               | 65%                                                               |
| Side slope:             | 35%                                                               |
| Armour:                 | Classified                                                        |
| Armour type:            | Steel                                                             |
| NBC system:             | Optional                                                          |
| Night vision equipment: | Optional                                                          |

## DEVELOPMENT

The LOV family of 4 x 4 vehicles was developed from 1992 by the Torpedo company to meet the requirements of the Croatian Army for a basic armoured personnel carrier which could be adopted for a wide range of operational roles.

The LOV is based on the locally produced Torpedo TK - 130 T-7 (4 x 4) truck chassis to which an all welded steel body has been fitted which provides the occupants with protection from small arms fire and shell splinters.

The driver is seated at the front left with the commander front right with the powerpack installed towards the front of the vehicle. The troop compartment is at the rear and entry via two doors.

The basic APC is fitted with a roof mounted 12.7mm M2 machine gun with the gunner being provided with side and rear protection.

Standard equipment includes a central tyre pressure regulation system that allows the driver to adjust the tyre pressure to suit the terrain being crossed. Run flat tyre devices are also fitted as standard on the LOV.

Optional equipment includes air conditioning system, communications equipment, night vision equipment, electric winch and auxiliary power unit.

## VARIANTS

LOV-IZV reconnaissance  
LOV-Z command post  
LOV-ABKNBC reconnaissance  
LOV-RAKL 24/128 mm rocket launcher  
LOV-ED electronic warfare

## STATUS

Production. In service with Croatia.

## MANUFACTURER

RH ALAN, Rijeka, Croatia





Above: LOV-IZV APC with 12.7mm MG

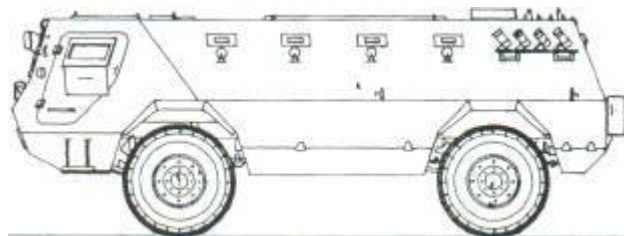
# Kader Fahd APC (Egypt)

## KEY RECOGNITION FEATURES

- Fully enclosed hull with front, sides and rear slightly sloping inwards
- Commander and driver sit front, each with large side door and large windscreen to immediate front which can be covered by armoured shutter hinged at top
- Radiator grille low down in nose of vehicle, firing ports in rear troop compartment, two-part rear entry hatch

## SPECIFICATIONS

|                                |                                                                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Crew:                          | 2+10                                                                                                                    |
| Configuration:                 | 4x4                                                                                                                     |
| Armament:                      | 1 x 7.62mm MG (see text), 2 x 4 smoke <u>grenade dischargers</u>                                                        |
| Ammunition:                    | 1,000 x 7.62mm <u>(estimate)</u>                                                                                        |
| Length:                        |                                                                                                                         |
| Width:                         | 2.45m                                                                                                                   |
| Height:                        | <u>2.1m (hull top)</u>                                                                                                  |
| Ground clearance:              | 0.31 to 0.37m                                                                                                           |
| Wheelbase:                     | 3.2m                                                                                                                    |
| <u>Weight, combat:</u>         | <u>10,900kg</u>                                                                                                         |
| <u>Weight, empty:</u>          | <u>9,100kg</u>                                                                                                          |
| <u>Power-to-weight ratio:</u>  | 15.4hp/tonne                                                                                                            |
| Engine:                        | Mercedes-Benz OM-352 A 6-cylinder direct injection water-cooled turbocharged diesel developing <u>168hp at 2,800rpm</u> |
| <u>Maximum road speed:</u>     | <u>90km/hr</u>                                                                                                          |
| <u>Maximum road range:</u>     | <u>800km</u>                                                                                                            |
| <u>Fording:</u>                | 0.7m                                                                                                                    |
| <u>Vertical obstacle:</u>      | 0.5m                                                                                                                    |
| Trench:                        | 0.9m                                                                                                                    |
| Gradient:                      | 70%                                                                                                                     |
| <u>Side slope:</u>             | 30**                                                                                                                    |
| Armour:                        | 10mm (maximum)(estimate)                                                                                                |
| Armour type:                   | Steel                                                                                                                   |
| NBCsystem:                     | <u>Optional</u>                                                                                                         |
| <u>Night vision equipment:</u> | <u>Optional</u>                                                                                                         |



## DEVELOPMENT

Fahd (4x4) was designed by the now Henschel Wehrtechnik, Germany, under the designation TH 390 to meet requirements of the Egyptian Army. Production commenced in 1985, first deliveries in 1986. It consists of a modified Mercedes-Benz truck chassis with an armoured body that provides complete protection from attack by 7.62 x 54mm armour-piercing projectiles and shell splinters.

Commander and driver sit front, engine below and between, troop compartment rear, normal means of entry and exit for 10 troops via two-part hatch in rear, top part opens upwards and lower part folds downwards to form step. Firing ports with vision block above in each side of troop compartment, another each side of rear entry hatch. Hatches in roof.

Standard equipment includes central tyre pressure regulation system allowing driver to adjust tyre pressure to suit ground, power-assisted steering. Options include NBC system, front-mounted winch, ventilation system, night vision equipment and smoke grenade dischargers.



Fahd 30 was shown for the first time in 1991 and is essentially the Fahd fitted with the complete turret of the Soviet BMP-2 IFV armed with 30mm cannon, 7.62mm coaxial machine gun and roof-mounted ATGW.

#### VARIANTS

Fahd can be fitted with wide range of armaments ranging from pintle-mounted 7.62mm MG up to 20mm cannon. Variants suggested by manufacturer include ambulance, command post, multiple rocket launcher, recovery, minelayer and internal security. Latest production vehicles are powered by the Mercedes-Benz OM 366 LA 6-cylinder diesel developing 240hp at 2,600rpm.

#### STATUS

Production. In service with Algeria, Egypt, Kuwait, Oman, Sudan and the Democratic Republic of Congo.

#### MANUFACTURER

Kader Factory for Developed Industries, Heliopolis, Egypt.

**Top left: Fahd (4x4) without armament**

**Right: Fahd (4x4) fitted with BMP-2 turret**



# Kader Walid APC (Egypt)

## KEY RECOGNITION FEATURES

- Fully enclosed engine compartment front with horizontal armoured grille to protect radiator, troop compartment rear with vertical sides and rear with sides sloping slightly inwards, three circular firing ports each side
- Commander's and driver's doors open forwards, rear door with spare wheel and tyre open to left, firing port each side
- Similar in appearance to former Soviet BTR-40 (4x4) APC but Walid is larger with rear wheel arches straight rather than curved, as in BTR-40

## SPECIFICATIONS

|                         |                          |
|-------------------------|--------------------------|
| Crew:                   | 2+8/10                   |
| Configuration:          | 4x4                      |
| Armament:               | 1 x 7.62mm MG            |
| Ammunition:             | 1,000 x 7.62mm           |
| Length:                 | 6.12m                    |
| Width:                  | 2.57m                    |
| Height:                 | 2.3m                     |
| Ground clearance:       | 0.4m                     |
| Wheelbase:              | Not available            |
| Weight, combat:         | 12,000kg (estimate)      |
| Weight, empty:          | 9,200kg (estimate)       |
| Power-to-weight ratio:  | 14hp/tonne (estimate)    |
| Engine:                 | 168hp diesel             |
| Maximum road speed:     | 86km/hr                  |
| Maximum range:          | 800km                    |
| Fuel capacity:          | Not available            |
| Fording:                | 0.8m (estimate)          |
| Vertical obstacle:      | 0.5m (estimate)          |
| Trench:                 | Not applicable           |
| Gradient:               | 60%                      |
| Side slope:             | 30%                      |
| Armour:                 | 8mm (maximum) (estimate) |
| Armour type:            | Steel                    |
| NBC system:             | None                     |
| Night vision equipment: | None                     |

## DEVELOPMENT

Walid (4x4) was developed in the 1960s and used for the first time in the 1967 Middle East campaign. Consists of a German Magirus Deutz chassis made in Egypt and fitted with open-topped armoured body. Walid 2 was introduced in 1981 and is based on Mercedes-Benz automotive components. It has now been succeeded in production by Fahd (4x4) APC (qv). Commander and gunner sit to rear of engine, troop compartment at rear, 7.62mm MG normally mounted on forward part of hull roof firing forwards. Additional weapons can be mounted round top of hull. Walid has no amphibious capability and no central tyre pressure regulation system.

## VARIANTS

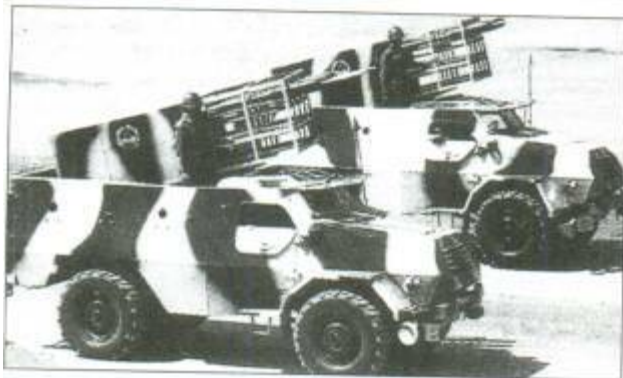
Only known variants are minelayer with ramp at rear for laying mines on surface, and multiple rocket launcher with 12 rockets in ready-to-launch position. The latter has 12 80mm D-3000 rockets with a maximum range of 2,500m. There is also a six round version with six 122mm D-6000 smoke rockets with a maximum range of 6000m.

## STATUS

Production complete. In service with Burundi, Israel, Sudan and Yemen.

## MANUFACTURER

Kader Factory, Cairo, Egypt.



*Above Left: Walid  
with launcher for  
smoke rockets  
(Egyptian Army)*

*Above: Walid in  
mine-laying role  
with doors open  
(Christopher F  
Foss)*

*Left: Walid*

## ACMAT APC (TPK 4.20 VSC) (France)

### KEY RECOGNITION FEATURES

- Engine front with radiator grilles under nose, sloped windscreen with two windows covered by armoured shutters hinged at top, side door to immediate rear of windscreen which opens forwards
- Horizontal roof line that extends to rear, two doors in hull rear, troop compartment at rear has three square bullet-proof windows each side
- Two road wheels each side with hull sides sloping inwards from just above road wheels

### SPECIFICATIONS

|                               |                                                                      |
|-------------------------------|----------------------------------------------------------------------|
| Crew:                         | 2+8/10                                                               |
| Configuration:                | 4x4                                                                  |
| Armament:                     | See text                                                             |
| Length:                       | 5.98m                                                                |
| Width:                        | 2.1m                                                                 |
| H <sup>1</sup> icjlrJJuH to£: | 2.205m                                                               |
| Ground clearance (axle):      | 0.273m                                                               |
| Ground clearance (hull):      | 0.5m                                                                 |
| Wheelbase:                    | 3.6m                                                                 |
| Weight, combat:               | 7,800kg                                                              |
| Weight, empty:                | 6,000kg                                                              |
| Power-to-weight ratio:        | J <sup>^</sup> .49hrj/toruTe                                         |
| Engine:                       | Perkins Model 6.354.4 6-cylinder diesel developing 138hp at 2,800rpm |
| Maximum road speed:           | 95km/hr                                                              |
| Maximum range:                | 1,600km                                                              |
| Fuel capacity:                | 310 lit                                                              |
| Fording:                      | 0.8m                                                                 |
| Trench:                       | Not applicable                                                       |
| Gradient:                     | 60%                                                                  |
| Side slope:                   | 40%                                                                  |
| Armour:                       | 5.8mm (maximum)                                                      |
| Armour type:                  | Steel                                                                |
| NBCj>yj>terij                 | None                                                                 |
| Night vision equipment:       | None                                                                 |

### DEVELOPMENT

TPK 4.20 VSC was designed as a private venture by ACMAT and is a VLRA (4x4) 2,500kg long-range reconnaissance vehicle with an armoured body. First prototype completed in 1980 and production commenced same year. Engine is at far front with driver and commander to its immediate rear and troop compartment extending right to rear of vehicle. Troops sit at rear on bench seats down each side. One version has fully enclosed roof with three sliding bullet-proof windows each side allowing some occupants to use small arms from inside. Other model has open roof and sides hinged outwards and downwards at mid-point for rapid exit or return fire.

Optional equipment on open-topped version includes 81mm TDA mortar firing to rear, 7.62mm or 12.7mm pintle-mounted MGs or Euromissile MILAN ATGW. Fully enclosed version can have air-conditioning system and be used as command or radio vehicle.

### VARIANTS

VBL light armoured car is essentially the fully enclosed APC with one-man turret on roof armed with 7.62mm or 12.7mm MG. The VBL can be fitted with different radios and an air conditioning system and be modified for more specific roles such as an ambulance or command post vehicle. 6x6 version still at prototype stage, designated TPK 6.40 VBL

### STATUS

In production. In service with a number of countries including Central African Republic, Cote d'Ivoire, Gabon and Saudi Arabia.

### MANUFACTURER

ACMAT, Ateliers de Construction Mecanique de l'Atlantique, Saint-Nazaire, France.



Above: ACMAT VBL light armoured car with one-man turret armed with 12.7mm M2 HB and 7.62mm MGs

# Panhard VBL Scout Car (France)

## KEY RECOGNITION FEATURES

- Almost vertical hull front, sloping glacis plate with large access panel in upper part, forward part of rear crew compartment slopes to rear, horizontal roof with three hatches, single door in hull rear
- Two large road wheels, hull above wheel arches slope inwards, single forward-opening door in each side with bullet-proof window in upper part
- Heavy armament, eg 12.7mm M2 HB MG or MILAN, is mounted on circular hatch at rear

## SPECIFICATIONS

|                         |                                                                        |
|-------------------------|------------------------------------------------------------------------|
| Crew:                   | 3                                                                      |
| Configuration:          | 4x4                                                                    |
| Armament:               | 1 x 7.62mm MG, 1 x MILAN ATGW launcher                                 |
| Ammunition:             | 3000 x 7.62mm, 6 x MILAN ATGW                                          |
| Length:                 | 3.87m                                                                  |
| Width:                  | 2.02m                                                                  |
| Height:                 | 1.7m (hull top), 2.14m (with 7.62mm MG)                                |
| Ground clearance:       | 0.37m                                                                  |
| Wheelbase:              | 2.45m                                                                  |
| Weight, combat:         | 3590kg                                                                 |
| Weight, empty:          | 2890kg                                                                 |
| Power-to-weight ratio:  | 26.76hp/tonne                                                          |
| Engine:                 | Peugeot XD3T, 4-cylinder turbocharged diesel developing 95hp @ 4150rpm |
| Maximum road speed:     | 95km/hr                                                                |
| Maximum water speed:    | 4.5km/hr                                                               |
| Maximum road range:     | 600km, 800km with onboard fuel cans                                    |
| Fording:                | 0.9m (see text)                                                        |
| Trench:                 | 0.50m                                                                  |
| Gradient:               | 50%                                                                    |
| Side slope:             | 30%                                                                    |
| Armour:                 | 11.5mm (maximum)                                                       |
| Armour type:            | Steel                                                                  |
| NBC system:             | Yes                                                                    |
| Night vision equipment: | Yes (passive for driver)                                               |

(Above relates to French Army VBL in combat/anti-tank role)

## DEVELOPMENT

In 1978 the French Army issued a requirement for a new light reconnaissance/anti-tank vehicle, the Vehicule Blindé Léger (VBL). Panhard and Renault each built prototypes for competitive evaluation and in February 1985 the Panhard VBL was selected, although at this time the vehicle was already in production for Mexico. The exact number of vehicles required by the French Army is still uncertain but the first order was for 569 vehicles with the first production vehicles for the French Army being completed late in 1990. The French Army has two basic versions of the VBL, combat/anti-tank with a three-man crew armed with a MILAN ATGW launcher and 7.62mm MG, and intelligence/scout with a two-man crew and armed with one 7.62mm and one 12.7mm MG. The 1000th VBL vehicle was completed at the Panhard production facility at Marolles in October 1995.

All versions have engine front and crew compartment rear with three roof hatches and three doors. It is fully amphibious, with propeller at hull rear, and standard equipment includes central tyre pressure system. Options include heater, powered steering and air-conditioning system.

## VARIANTS

Panhard has proposed over 20 models of the VBL for the export market including radar (battlefield and air defence), anti-aircraft (Mistral SAMs), anti-tank (MILAN, HOT or TOW ATGWs) and internal security to name but a few. There is also a long wheelbase version of the VBL.

## STATUS

In production. In service with Benin, Cameroon, Djibouti, France, Gabon, Greece, Indonesia, Kuwait, Oman, Mexico, Niger, Nigeria,





Portugal, Qatar, Rwanda and Togo.

#### **MANUFACTURER**

Societe de Constructions Mecaniques Panhard et Levassor,  
Paris, France.

*Above: Panhard VBL with TOW missile*

*Above right: Panhard VBL with 12.7mm MG*

*Right: Panhard VBL without armament*





# Panhard M3 APC (France)

## KEY RECOGNITION FEATURES

- Pointed front with well sloped glacis plate, driver's position in upper part, horizontal roof with main armament normally centre, secondary armament rear
- Vertical hull sides with upper part sloping inwards, three observation/firing hatches each side, vertical hull rear with two outward-opening doors each with firing port
- Two large road wheels each side with forward-opening door between, wheels outside hull envelope with mudguards which blow off if vehicle runs over mine

## SPECIFICATIONS

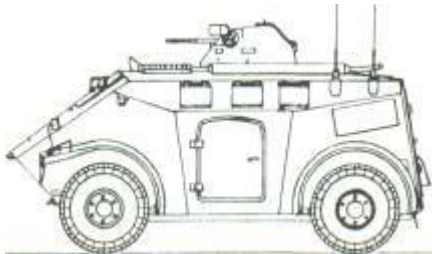
|                         |                                                                             |
|-------------------------|-----------------------------------------------------------------------------|
| Crew:                   | 2+10                                                                        |
| Armament:               | See text                                                                    |
| Length:                 | 4.45m                                                                       |
| Width:                  | 2.4m                                                                        |
| Height:                 | 2.48m (with twin 7.62mm MG turret)                                          |
| Height to hull top:     | 2m                                                                          |
| Ground clearance:       | 0.35m                                                                       |
| Wheelbase:              | 2.7m                                                                        |
| Weight, combat:         | 6,100kg                                                                     |
| Weight, unloaded:       | 5,300kg                                                                     |
| Power-to-weight ratio:  | 14.75hp/tonne                                                               |
| Engine:                 | Panhard Model 4 HD 4-cylinder air-cooled petrol developing 90hp at 4,700rpm |
| Maximum road speed:     | 90km/hr                                                                     |
| Maximum water speed:    | 4km/hr                                                                      |
| Maximum road range:     | 600km                                                                       |
| Fuel capacity:          | 165 lit                                                                     |
| Fording:                | Amphibious                                                                  |
| Vertical obstacle:      | 0.3m                                                                        |
| Trench (1 channel):     | 0.8m                                                                        |
| Trench (5 channels):    | 3.1m                                                                        |
| Gradient:               | 60%                                                                         |
| Side slope:             | 30%                                                                         |
| Armour:                 | 12mm (maximum)                                                              |
| Armour type:            | Steel                                                                       |
| NBC system:             | Optional                                                                    |
| Night vision equipment: | Optional                                                                    |

## DEVELOPMENT

M3 (4x4) was developed by Panhard as a private venture, first prototype completed in 1969 and first production vehicles in 1971. Well over 1,200 have been built for export with sales made to some 35 countries. Ninety-five per cent of automotive components are identical to those of the Panhard AML range 4x4 armoured cars. Panhard M3 is used for a wide range of roles including internal security, ambulance and command post. Driver sits front, engine to his rear, troop compartment occupies remainder of vehicle. Troops enter and leave via single door in sides and twin doors in rear. Eight firing ports. Wide range of turrets, mounts and cupolas can be mounted on roof armed with cannon, machine guns and ATGWs such as MILAN. Vehicle is fully amphibious, propelled by its wheels. Wide range of optional equipment including front-mounted winch, air-conditioning system and two electrically operated smoke grenade dischargers.

## VARIANTS

M3/VDA anti-aircraft vehicle with one-man power-operated turret armed with twin 20mm cannon. Before firing four outriggers are lowered to ground for a more stable firing platform. This version known to be in service with Ivory Coast, Niger and United Arab Emirates (Abu Dhabi). M3/VAT repair vehicle with lifting gear at rear. M3/VPC command vehicle with extensive communications equipment. M3/VLA engineer vehicle with front-mounted obstacle-clearing blade. M3/VT ambulance which carries four stretcher patients or six walking wounded, or a mixture, plus its crew. M3 radar can be fitted with wide range of radars including RASIT



*Left:  
Panhard M3  
(4x4) with  
twin  
7.62mm MG  
turret*

*Right:  
Panhard M3  
with  
7.62mm MG*



*Right:  
Panhard  
M3/VAT*



battlefield surveillance radar or RA 205 surveillance radar. Buffalo ARC which in 1986 replaced Panhard M3 in production. Essentially a Panhard M3 with additional external stowage spaces and original petrol engine replaced by 146hp V-6 petrol or 95hp diesel. This model now in production and in service with Benin, Colombia and Rwanda. The 95hp diesel is the same Peugeot XD3T that is fitted to the Panhard VBL (4x4) light armoured vehicle and can be bracketed to the Panhard AML

#### **STATUS**

Production complete, replaced in production by Buffalo. M3 known to be in service with Algeria, Bahrain, Burkina Faso, Burundi, Chad, Democratic Republic of Congo, Gabon, Iraq, Ireland, Ivory Coast, Kenya, Lebanon, Malaysia, Mauritania, Morocco, Niger, Nigeria, Rwanda, Saudi Arabia, Senegal, Togo, United Arab Emirates.

#### **MANUFACTURER**

Societe de Constructions Mecaniques Panhard et Levassor, Paris, France.

# Panhard AML Light Armoured Car (France)

## KEY RECOGNITION FEATURES

- Well sloped inverted V glacis plate with driver's hatch in upper part, horizontal hull top with engine rear, stowage boxes project forward of rear wheels. Diesel engine version has different hull rear

- Turret has bustle that extends over hull rear, vertical sides slope slightly inwards. 90mm gun has prominent double-baffle muzzle brake, no fume extractor or thermal sleeve. Two smoke grenade dischargers each side at turret rear

- Two large road wheels each side with large rearward-opening door to rear of first road wheel. Left door has spare wheel and tyre. Sand channels normally carried across lower hull front

## SPECIFICATIONS (H 90 VERSION)

|                                    |                                                                                                                                                                              |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Crew:                              | 3                                                                                                                                                                            |
| <u>Configuration:</u>              | 4x4                                                                                                                                                                          |
| Armament:                          | 1 x 90mm, 1 x 7.62mm MG coaxial, 2 x 2 smoke grenade dischargers                                                                                                             |
| Ammunition:                        | 20 x 90mm, 2,000 x 7.62mm                                                                                                                                                    |
| Length gun forwards:               | 5.11m                                                                                                                                                                        |
|                                    | 3.79m                                                                                                                                                                        |
|                                    | 1.97m                                                                                                                                                                        |
| <u>Height overall:</u>             | 2.07m                                                                                                                                                                        |
| Ground clearance:                  | 0.33m                                                                                                                                                                        |
| Wheelbase:                         | 2.5m                                                                                                                                                                         |
| <u>Weight, combat:</u>             | 5,500kg                                                                                                                                                                      |
| Power-to-weight ratio:             | 16.36hp/tonne                                                                                                                                                                |
| Engine:                            | Panhard Model 4 HD 4-cylinder air-cooled petrol developing 90hp at 4,700rpm. Current production models have Peugeot XD 3T diesel developing 98hp and a range of 700 to 800km |
| Maximum road speed:                | 90km/hr                                                                                                                                                                      |
| Maximum road range:                | 600km                                                                                                                                                                        |
| Fuel capacity:                     | <u>156 lit</u>                                                                                                                                                               |
| Fording:                           | <u>1.1m</u>                                                                                                                                                                  |
| Vertical obstacle:                 | 0.3m                                                                                                                                                                         |
| Trench with one channel:           | 0.8m                                                                                                                                                                         |
| <u>Trench with three channels:</u> | <u>3.1m</u>                                                                                                                                                                  |
| Gradient:                          | 60%                                                                                                                                                                          |
| <u>Side slope:</u>                 |                                                                                                                                                                              |
| Armour:                            | 8-12mm (hull)                                                                                                                                                                |
| Armour type:                       | Steel                                                                                                                                                                        |
| <u>NBC system:</u>                 | None                                                                                                                                                                         |
| Night vision equipment:            | Optional                                                                                                                                                                     |

## DEVELOPMENT

Panhard AML (Automitrailleuse Legere) was developed for the French Army with first prototypes completed in 1959 and first production vehicles in 1961. By 1999 over 4,800 vehicles had been built for home and export (including those built under licence in South Africa by Sandcock-Austral). Panhard M3 (4x4) armoured personnel carrier (qv) shares 95 per cent automotive components of AML and has also been built in large numbers.

All AMLs have similar layout with driver front, turret centre and engine rear. The Hispano-Suiza two-man H90 turret traverses through 360° and the 90mm gun elevates from -8° to +15°. Main armament comprises 90mm gun which fires HE, HEAT, canister and smoke projectiles. 7.62mm machine gun is mounted coaxial with left of main armament, and 7.62mm or 12.7mm machine gun can be mounted on turret roof.

## VARIANTS

AML with Lynx 90 turret. Replaced H90 turret, similar armament but can have powered traverse, laser rangefinder and night vision equipment, commander's cupola raised on left side. AML with HE-60-7 turret, 60mm mortar and twin 7.62mm MGs.

AML with HE60-12 turret, 60mm mortar and 12.7mm MG. AML with HE60-20 turret, 60mm mortar and 20mm cannon. AML with HE60-20 Serval turret, replaced above in production.

AML with S 530 turret, twin 20mm anti-aircraft cannon, used only by Venezuela.

AML with diesel engine, current production AMLs have Panhard diesel replaced by more fuel efficient Peugeot diesel which is also installed in the Panhard VBL (4x4) (qv) light armoured vehicle. Panhard also now offer an upgrade package

that can include the new diesel engine, improved automotives, new exhaust and upgraded weapons. For the H90 turret, for example, the 90mm gun can be modified to fire APFSDS ammunition, a laser rangefinder added for improved first round hit probability and passive night vision equipment installed.

South African-built vehicle is known as Eland and ran through to Mk 7 in two basic versions: Eland 60 with 60mm mortar and 7.62mm MG and Eland 90 with 90mm gun and 7.62mm coaxial MG. Both have roof-mounted 7.62mm MG, different engine and detailed differences to French-built vehicles.

#### STATUS

Production as required. In service with Algeria, Argentina, Bahrain, Benin, Bosnia Herzegovina, Burkina Faso, Burundi, Chad, Djibouti, Ecuador, El Salvador, France, Gabon, Iraq, Ireland, Ivory Coast, Kenya, Lebanon, Lesoto, Malawi, Malaysia, Mauritania, Morocco, Niger, Nigeria, Polisario guerrillas, Portugal, Rwanda, Saudi Arabia, Senegal, Somalia, South Africa, Sudan, Togo, Tunisia, United Arab Emirates, Venezuela, Yemen and Zimbabwe.

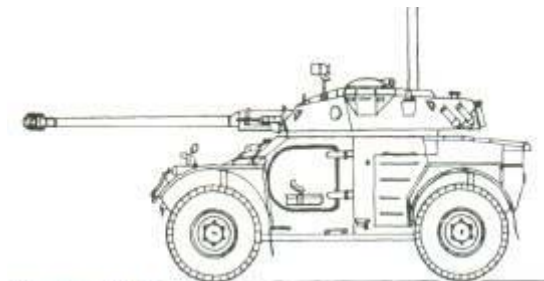
#### MANUFACTURERS

Societe de Constructions Mecaniques Panhard and Levassor, Paris, France; Sandock Austral (today called Reumech OMC), South Africa.



**Above: Panhard AML with HE60-20 Serval turret**

**Right: Panhard AML with H90 90mm turret**



# Berliet VXB-170 APC (France)

## KEY RECOGNITION

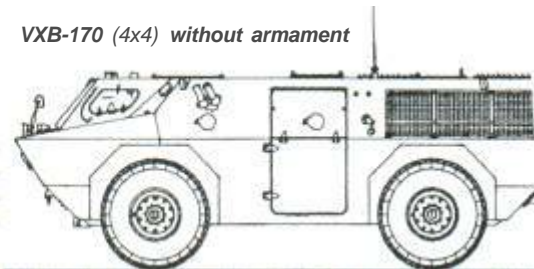
### FEATURES

- Four large road wheels, hull has pointed nose with driver far front, large windscreen to front and sides
- Lower half of hull vertical, top half sloping slightly inwards, single door in each hull side
- Engine compartment left rear with grilles in roof, entry door in right hull rear

## SPECIFICATIONS

|                               |                                                              |
|-------------------------------|--------------------------------------------------------------|
| Crew:                         | <b>N II</b>                                                  |
| Configuration:                | -IV                                                          |
| Armament:                     | 1 x 7.62mm MG, 2 x 2 smoke grenade dischargers (optional)    |
| Ammunition:                   | 1,000 x 7.62mm                                               |
| Length:                       | 5.99m                                                        |
| Width:                        | 2.5m                                                         |
| Height:                       | 2.05m (without armament)                                     |
| Ground clearance:             | 0.45m                                                        |
| Wheelbase:                    | 3m                                                           |
| Weight, combat:               |                                                              |
| <u>Weight, empty:</u>         | 9,800kg                                                      |
| <u>Power-to-weight ratio:</u> | 13.38hp/tonne                                                |
| Engine:                       | Berliet model V800 M V-8 diesel developing 170hp at 3,000rpm |
| <u>Maximum road speed:</u>    | 85km/hr                                                      |
| Maximum water speed:          | 4km/hr                                                       |
| Road range:                   | 750km                                                        |
| <u>Fuel capacity:</u>         | 220 lit                                                      |
| Fording                       | Amphibious                                                   |
| Vertical obstacle:            | 0.3m                                                         |
| Trench:                       |                                                              |
| Gradient:                     | 60%                                                          |
|                               | 30%                                                          |
| Armour:                       | 7mm                                                          |
|                               | Steel                                                        |
| <u>NBC system:</u>            | None                                                         |
| Night vision equipment:       | Optional                                                     |

VXB-170 (4x4) without armament



## DEVELOPMENT

VXB-170 was developed as a private venture by Societe des Automobiles Berliet under the designation BL-12, first prototype completed in 1968. With a number of improvements it was adopted by the French Gendarmerie for internal security, the first of 155 vehicles delivered in 1973. In 1975 Berliet became part of the Renault Group which also included Saviem, so production of VXB-170 was phased out after completion of existing orders; the French Army had adopted the VAB to meet its future requirements.

VXB-170 has an all-welded steel hull, driver front and troop compartment extending right to rear of vehicle, except for engine compartment on left side at rear. In addition to the three doors there are five hatches in roof, one for driver with larger circular hatch to rear on which main armament is normally mounted.

French Gendarmerie vehicles are blue and normally have hydraulically operated obstacle clearing blade at hull front and are fitted with roof-mounted SAMM BTM 103 light turret armed with 7.62mm MG and 40mm grenade launcher. Turret

traverse is 360° and weapon elevation from -15° to +60°.

VXB-170 is fully amphibious, propelled by its wheels, and optional equipment included heater, night vision equipment, NBC system, front-mounted winch and bullet-proof tyres.

#### VARIANTS

Wide range of variants were projected and prototypes of some were built, for example with a two-man turret from the AML armed with 60mm mortar and 7.62mm MGs. None entered production.

#### STATUS

Production complete. In service with France (Gendarmerie), Gabon and Senegal.

#### MANUFACTURER

Societe des Automobiles Berliet, Bourge, France.



*Above: VXB-170 (4x4) with cupola-mounted MG*

*Right: VXB-170 (4x4) without armament (Christopher F Foss)*

*Left: VXB-170 (4x4) showing amphibious capabilities*

# Henschel Wehrtechnik TM 170 APC (Germany)

## KEY RECOGNITION FEATURES

- Box-type engine compartment front, radiator grille under nose with slightly sloping glacis plate, almost vertical windscreen which can be covered by two armoured shutters hinged at bottom, horizontal roof with hull rear sloping inwards
- Two road wheels each side, bullet-proof window in upper part of hull front which can be covered by hinged shutter, single door in each side of hull and hatch in hull rear
- Troop compartment has firing ports in sides and rear, hull sides are welded midway up then slope inwards at top and bottom

## SPECIFICATIONS

|                         |                                                                    |
|-------------------------|--------------------------------------------------------------------|
| Crew:                   | 2+10                                                               |
| Configuration:          | 4x4                                                                |
| Armament:               | Optional                                                           |
| Length:                 | 6.14m                                                              |
| Width:                  | 2.47m                                                              |
| Height:                 | 2.32m (hull top)                                                   |
| Ground clearance:       | 0.48m                                                              |
| Wheelbase:              | 3.25m                                                              |
| Weight, combat:         | 11.650k3                                                           |
| Weight, unloaded:       | 8800kg                                                             |
| Power-to-weight ratio:  | 18hp/tonne                                                         |
| Engine:                 | Daimler-Benz OM366 supercharged diesel developing 240hp at 1400rpm |
| Maximum road speed:     | 100km/hr                                                           |
| Maximum water speed:    | 9km/hr                                                             |
| Maximum road range:     | 870km                                                              |
| Fuel capacity:          | 200 lit                                                            |
| Fording:                | Amphibious                                                         |
| Vertical obstacle:      | 0.6m                                                               |
| Trench:                 | Not applicable                                                     |
| Gradient:               | 80o/o                                                              |
| Side slope:             | 40%                                                                |
| Armour:                 | 8mm (estimate)                                                     |
| Armour type:            | Steel                                                              |
| NBC system:             | Optional                                                           |
| Night vision equipment: | Optional                                                           |

## DEVELOPMENT

TM 170 (4x4) was developed as a private venture by Thyssen Henschel (today called Henschel Wehrtechnik) and entered production in 1979. It consists of a UNIMOG cross-country

truck chassis with an all-welded steel body for protection from small arms fire and shell splinters.

Engine compartment is front with commander and driver to its immediate rear and troop compartment extending right to rear of vehicle. Wide range of weapon stations can be mounted on top of hull to rear of commander's and driver's position, such as turret with twin 7.62mm MGs or one-man turret with 20mm cannon.

Basic vehicle is fully amphibious, propelled by its wheels or two waterjets which give maximum speed of 9km/hr. Before entering the water a trim vane is erected at the front and bilge pumps switched on. Wide range of optional equipment available including NBC system, night vision equipment, obstacle clearing blade, smoke grenade dischargers, winch, flashing lights, fire extinguishing system, heater, spherical firing ports and loudspeaker.

## VARIANTS

TM 170 can be adapted for a wide range of roles including communications and workshop vehicles. More recent version is TM 170 Hardliner with a number of detailed improvements.

Thyssen Henschel also built prototypes of TM 125 and TM 90 (4x4) armoured personnel carriers, but they did not enter production and are no longer being offered.

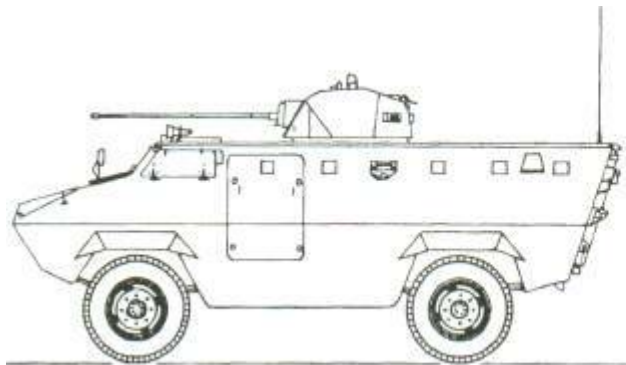
## STATUS

In production. In service with German Border Guard, under designation SW4, and State Police and other undisclosed countries.

## MANUFACTURER

Henschel Wehrtechnik, Kassel, Germany.





*Above: TM 170 (4x4) with 20mm turret*

*Top right: TM 170 (4x4) from the rear (Christopher F Foss)*

*Left: TM 170 (4x4)*

*Right: TM 170 (4x4) with obstacle clearing blade*



# Henschel Wehrtechnik UR-416 APC (Germany)

## KEY RECOGNITION FEATURES

- Box-shaped hull with front sloping to rear, horizontal roof, sloping rear which sometimes has spare wheel, hull sides slope inwards from above wheel arches

- Radiator grilles on lower hull front with observation flaps at top which hinge upwards for normal use, firing ports in sides and rear of hull

- Armament normally mounted on forward part of roof, two road wheels each side with single door in each side and one rear

## SPECIFICATIONS

|                         |                                                                                 |
|-------------------------|---------------------------------------------------------------------------------|
| Crew:                   | 2+8                                                                             |
| Configuration:          | 4x4                                                                             |
| Armament:               | 1 x 7.62mm MG                                                                   |
| Ammunition:             | 1,000x 7.62mm                                                                   |
| Length:                 | 5.1m                                                                            |
| Width:                  | 2.25m                                                                           |
| Height:                 | 2.52m (with turret), 2.25m (hull top)                                           |
| Ground clearance:       | 0.44m                                                                           |
| Wheelbase:              | 2.9m                                                                            |
| Weight, combat:         | 7,600kg                                                                         |
| Weight, empty:          | 5,400kg                                                                         |
| Power-to-weight ratio:  | 16.5hp/tonne                                                                    |
| Engine:                 | Daimler-Benz OM 352 6-cylinder water-cooled diesel developing 120hp at 2,800rpm |
| Maximum road speed:     | 81km/hr                                                                         |
| Maximum road range:     | 600 to 700km                                                                    |
| Fuel capacity:          | 150 lit                                                                         |
| Fording:                | 1.3m                                                                            |
| Vertical obstacle:      | 0.55m                                                                           |
| Trench:                 | Not applicable                                                                  |
| Gradient:               | 70%                                                                             |
| Side slope:             | 35%                                                                             |
| Armour:                 | 9mm                                                                             |
| Armour type:            | Steel                                                                           |
| NBC system:             | None                                                                            |
| Night vision equipment: | Optional                                                                        |

## DEVELOPMENT

UR-416 was developed by Rheinstahl Maschinenbau (now Henschel Wehrtechnik) as a private venture, first prototype

completed in 1965. Production commenced in 1969, since when over 1,000 have been built, mostly for export where it is normally used in internal security by police or other paramilitary units.

UR-416 is a Mercedes-Benz (4x4) UNIMOG cross-country truck chassis with an all-welded body that provides protection from small arms fire and shell splinters.

Commander and driver sit front with engine forward and below, leaving the whole of the rear clear for troops. Basic model has three doors, one each side and one in rear, and is fitted with various weapons on the roof ranging from simple pintle-mounted 7.62mm MG to turret armed with 20mm cannon.

Optional equipment includes spherical firing ports with vision devices, fire detection and extinguishing system, air-conditioning system, heater, run-flat tyres, smoke grenade dischargers and 5,000kg capacity winch.

## VARIANTS

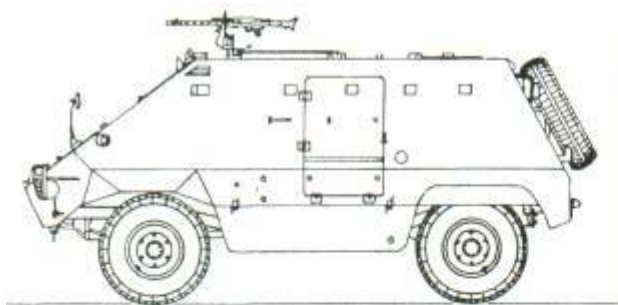
UR-416 can be adopted for wide range of roles including ambulance, anti-tank (recoilless rifle or missile), internal security (with wide range of equipment including obstacle-clearing blade front), reconnaissance and workshop. Latest version is UR-416 M which has many detailed improvements including better visibility and armoured flaps.

## STATUS

Production complete. Known users include Argentina, Ecuador, El Salvador, Germany, Greece, Kenya, Morocco, Netherlands, Pakistan, Peru, Philippines, Qatar, Saudi Arabia, Spain, Togo, Turkey, Venezuela and Zimbabwe.

## MANUFACTURER

Thyssen Maschinenbau, Witten-Annen, Germany.



*Top left: UR-416 (4x4) with 7.62mm MG*

*Left: UR-416 with 12.7mm MG (Julio Mantes)*

*Above: UR-416 with 12.7mm MG (Julio Mantes)*

# Henschel Wehrtechnik Condor APC (Germany)

## KEY RECOGNITION FEATURES

- Box-type hull with driver's position far front left side, distinctive windows to front and sides, nose slopes back under hull and glacis slopes up to horizontal hull roof that extends right to rear, all four corners of hull angled
- Two large road wheels each side with forward-opening door in each side and another door in rear
- Hull sides slope inwards top and bottom with external wheel arches

## SPECIFICATIONS

|                         |                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------|
| Crew:                   | 2+12                                                                                    |
| Configuration:          | 4x4                                                                                     |
| Armament:               | 1 x 20mm, 1 x 7.62mm MG (coaxial),<br>2 x 3 smoke grenade dischargers                   |
| Ammunition:             | 220 x 20mm, 500 x 7.62mm                                                                |
| Length:                 | 6.13m                                                                                   |
| Width:                  | 2.47m                                                                                   |
| Height:                 | 2.79m (turret top), 2.18m (hull top)                                                    |
| Ground clearance:       | 0.475m                                                                                  |
| Wheelbase:              | 3.275m                                                                                  |
| Weight, combat:         | JA40pj<a                                                                                |
| Weight, empty:          | 9,200kg                                                                                 |
| Power-to-weight ratio:  | 13.54hp/tonne                                                                           |
| Engine:                 | Daimler-Benz OM 352A 6-cylinder<br>supercharged water-cooled diesel<br>developing 168hp |
| Maximum road speed:     | 100km/hr                                                                                |
| Maximum water speed:    | 10Km/hr                                                                                 |
| Maximum road range:     | 900km                                                                                   |
| Fuel capacity:          | 280 lit                                                                                 |
| Fordm£:                 | Amphibious                                                                              |
| Vertical obstacle:      | 0.55m                                                                                   |
| Trench:                 | Not applicable                                                                          |
| Gradient:               | 60%                                                                                     |
| Side slope:             | 30%                                                                                     |
| Armour:                 | Classified                                                                              |
| Armour type:            | Steel                                                                                   |
| NBC system:             | Optional                                                                                |
| Night vision equipment: | Optional                                                                                |

## DEVELOPMENT

Condor was developed by Henschel Wehrtechnik as a private venture, first prototype completed in 1978. Wherever possible standard commercial components have been used in the design to keep procurement and life-cycle costs to a minimum. Largest order for Condor was placed by Malaysia in 1981 and consisted of 459 vehicles including ambulance, APC with twin 7.62mm MG, fitter's vehicle with crane, command post vehicle and APC with FVT900 one-man turret with 20mm cannon, 7.62mm MG coaxial with main armament and smoke grenade dischargers each side.

Driver sits front left, engine compartment to his right and troop compartment extending right to rear. Condor is fully amphibious, propelled by a propeller mounted under hull rear. Before entering the water a trim vane is erected at front of hull. Optional equipment includes heater and winch. The latter has 50m of cable and can be used to the front or rear of the vehicle.

## VARIANTS

Henschel Wehrtechnik offers wide range of armament including Thyssen turret with twin 7.62mm MGs, pintle-mounted 7.62mm and 12.7mm MGs and ATGWs such as HOT, MILAN and TOW.

## STATUS

Production complete. In service with Argentina, Indonesia, Malaysia, Portugal, Thailand, Turkey, Uruguay and other countries.

## MANUFACTURER

Henschel Wehrtechnik, Kassel, Germany.



*Above: Condor (4x4) with  
20mm turret*



*Above right: Condor (4x4)  
with 20mm turret (Richard  
Stickland)*



*Right: Condor (4x4) with  
MG turret (Richard  
Stickland)*

# FUG Amphibious Scout Car (Hungary)

## KEY RECOGNITION FEATURES

- Glacis plate slopes up to crew compartment which has sloping front and sides, roof hatches are only means of entry
- Engine compartment rear, roof almost parallel to crew compartment, exhaust pipe on right side
- Twin belly wheels each side which are raised when travelling on roads

## SPECIFICATIONS

|                        |                                                                                     |
|------------------------|-------------------------------------------------------------------------------------|
| Crew:                  | 2+4                                                                                 |
| Configuration:         | 4x4                                                                                 |
| Armament:              | 1 x 7.62mm MG                                                                       |
| Ammunition:            | 1250 x 7.62mm                                                                       |
| Length:                | 5.79m                                                                               |
| Width:                 | 2.5m                                                                                |
| Height:                | 1.91m (hull top), 2.25m (OT-65A turret top)                                         |
| Ground clearance:      | 0.34m                                                                               |
| Wheelbase:             | 3.3m                                                                                |
| Power-to-weight ratio: | 15.87hp/tonne                                                                       |
| Engine:                | Csepel D.414.44 4-cylinder in-line water-cooled diesel developing 100hp at 2,300rpm |
| Maximum road speed:    | 87km/hr                                                                             |
| Maximum water speed:   | 9km/hr                                                                              |
| Road range:            | 600km                                                                               |
| Fuel capacity:         | 200 lit                                                                             |
| Fording:               | Amphibious                                                                          |
| Vertical obstacle:     | 0.4m                                                                                |
| Trench:                | 1.2m                                                                                |
| Gradient:              | 60°                                                                                 |
| Side slope:            | 30°                                                                                 |
| Armour:                | 13mm (maximum)                                                                      |
| Armour type:           | Steel                                                                               |
| Armament:              | Yes (driver only, infra-red)                                                        |

## DEVELOPMENT

FUG (Felderito Uszo Gepkosc) entered service with the Hungarian Army in 1964 and fulfils a similar role to the Russian BRDM-1 (4x4) amphibious scout car. Major differences are that

FUG has engine rear and is propelled by two water jets at rear (BRDM-1 has one). Before entering water bilge pumps are switched on and trim vane, stowed under nose when not required, is erected. A 7.62mm SGMG MG is pintle-mounted on forward part of roof.

When travelling across rough country, two powered belly wheels are lowered each side to improve mobility. All FUGs have central tyre pressure regulation system.

## VARIANTS

Ambulance, but probably limited to walking wounded only as sole means of entry and exit is via roof hatches.

Radiological-chemical reconnaissance vehicle; mounted on each side of hull rear is a rack that dispenses lane marking poles.

OT-65A is a Czechoslovak modification, a basic FUG fitted with OT-62B turret (full tracked ARC armed with 7.62mm M59T machine gun). 82mm T-21 Tarasnice recoilless rifle on right side of turret.

PSZH-IV ARC, there is a separate entry in the wheeled Armoured personnel carriers section for the PSZH-IV (4x4) vehicle which has been called the FG-66 and FUG-70 in the past.

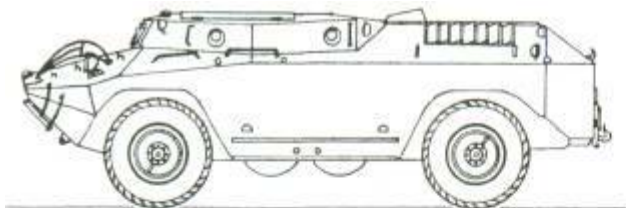
## STATUS

Production complete. In service with Czech Republic, Hungary (basic FUG is OT-65) and Slovakia.

## MANUFACTURER

Hungarian state arsenals.





*Top: FUG 14x4) without armament*

*Above: FUG (4x4) without armament*

*Above right: FUG (4x4) radiological-chemical reconnaissance vehicle with trim vane erected*

*Right: FUG (4x4)*





## FSZH-IV APC (Hungary)

### KEY RECOGNITION FEATURES

- Turret with no roof hatches over forward part of hull, 14.5mm MG right and 7.62 MG left
- Forward-opening door in each side of hull to rear of first road wheel station
- Trim vane for amphibious operations stowed on glacis plate

### SPECIFICATIONS

|                         |                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------|
| Crew:                   | 3+6                                                                                 |
| Configuration:          | 4x4                                                                                 |
| Armament:               | 1 x 14.5mm MG (main),<br>1 x 7.62mm MG (coaxial)                                    |
| Ammunition:             | 500 x 14.5mm, 2,000 7.62mm                                                          |
| Length:                 | 5.695m                                                                              |
| Width:                  | 2.5m                                                                                |
| Height:                 | 2.308m                                                                              |
| Ground clearance:       | 0.42m                                                                               |
| Wheelbase:              | 3.3m                                                                                |
| Weight, combat:         | 7,600kg                                                                             |
| Power-to-weight ratio:  | 13.15hp/tonne                                                                       |
| Engine:                 | Csepel D.414.44 4-cylinder in-line water-cooled diesel developing 100hp at 2,300rpm |
| Maximum road speed:     | 80km/hr                                                                             |
| Maximum fording speed:  | 9km/hr                                                                              |
| Road range:             | 500km                                                                               |
| Fuel capacity:          | 200 lit                                                                             |
| Fording:                | Amphibious                                                                          |
| Vertical obstacle:      | 0.4m                                                                                |
| Trench:                 | 0.6m (with channels)                                                                |
| Gradient:               | 60%                                                                                 |
| Side slope:             | 30%                                                                                 |
| Armour:                 | 14mm (maximum)                                                                      |
| Armour type:            | Steel                                                                               |
| NBC system:             | Yes                                                                                 |
| Night vision equipment: | Yes (infra-red for gunner and driver)                                               |

### DEVELOPMENT

PSZH-IV APC was developed in Czechoslovakia after the FUG (4x4) armoured amphibious scout car. PSZH-IV used to be called the FUG-66 or FUG-70 as it was originally thought to be a reconnaissance vehicle, not an APC.

Commander and driver sit front with one-man manually operated turret to rear. The 14.5mm KPVT and 7.62mm PKT MGs have manual elevation from -5° to +30°, turret traverse is manual through 360°. Commander and driver can leave via their roof hatches but the only means of entry and exit for troops and gunner is the small two-part door in each side of hull.

Unlike the former Soviet BRDM-2 (4x4) amphibious reconnaissance vehicle, PSZH-IV does not have belly wheels to improve cross-country mobility. It is, however, fully amphibious, propelled by two waterjets mounted to rear of hull. Standard equipment includes central tyre pressure regulation system and NBC system.

### VARIANTS

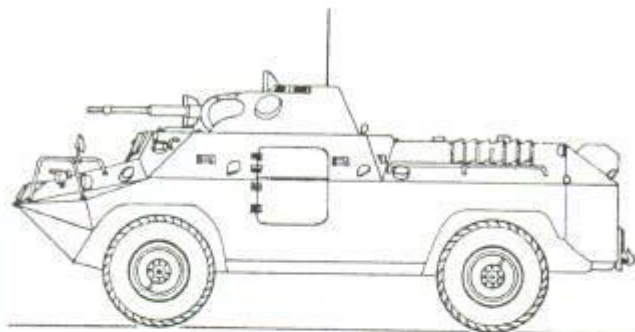
There are at least two command post versions of PSZH-IV, one with turret and one without turret. There is also an ambulance and radiological-chemical reconnaissance vehicle.

The latter is very similar to the former Soviet BRDM-2 vehicle designated the BRDM-2RKnb and is distinguishable by the two rectangular racks positioned one either side of the hull rear that dispense lane marking pennants into the ground.

### STATUS

Production complete. In service with Czech Republic (OT-66), Hungary, Iraq and Slovakia.

**MANUFACTURER** Hungarian state arsenals.



*Above: PSZH-IV*

*Above right: PSZH-IV*

*Right: PSZH-IV*



## RAM Family of Light AFVs (Israel)

### KEY RECOGNITION FEATURES

- Spare tyre in horizontal position at front, open-topped crew compartment centre with four upward-opening hatches in forward part (two front, one each side), engine compartment rear. No side doors

- Two large wheels each side at extreme ends of vehicle, high ground clearance, extensive external stowage

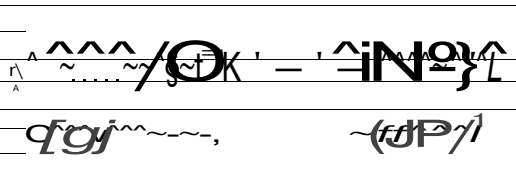
### SPECIFICATIONS (RAM V-1)

|                           |                                                      |
|---------------------------|------------------------------------------------------|
| Crew:                     | 2+7                                                  |
| Configuration:            | 4x4                                                  |
| Armament:                 | Depends on role                                      |
| Ammunition:               | Depends on role                                      |
| Length:                   | 5.52m                                                |
| Width:                    | 2.03m                                                |
| Height overall:           | 1.72m                                                |
| Ground clearance (hull):  | 3.9m                                                 |
| Ground clearance (axles): | 0.31m                                                |
| Wheelbase:                | 3.4m                                                 |
| Weight, combat:           | 5,750kg                                              |
| Weight, unloaded:         | 4,300kg                                              |
| Power-to-weight ratio:    | 22.05hp/t                                            |
| Engine:                   | Deutz air-cooled 6-cylinder diesel developing 132bhp |
| Maximum road speed:       | 96km/hr                                              |
| Maximum road range:       | 800km                                                |
| Fuel capacity:            | 160 lit                                              |
| Fording:                  | 1.00m                                                |
| Vertical obstacle:        | 0.8m                                                 |
| Trench:                   | Not applicable                                       |
| Gradient:                 | 64%                                                  |
| Side slope:               | 35%                                                  |
| Armour:                   | 8mm                                                  |
| Armour type:              | Steel                                                |
| NBC system:               | None                                                 |
| Night vision equipment:   | Optional                                             |

### DEVELOPMENT

In the early 1970s RAMTA Structures and Systems, a subsidiary of Israel Aircraft Industries, designed and built as a private

RAM V-1 mrith tuna 7.eESmmIWK I



venture the RBY Mk1 light armoured reconnaissance vehicle which was subsequently built for home and export markets. It could be used for a wide range of roles and with various weapon systems including pintle-mounted 7.62mm MGs up to a 106mm recoilless rifle. In 1979 the RAM family of light AFVs was announced by the same company and this has now replaced the RBY in production. The RAM family has been expanded into two basic groups: RAM V-1 open top and RAM V-2 closed top. Main improvements on the original RBY Mk1 are increased ground clearance owing to larger tyres, increased range of action (original petrol engine replaced by diesel), and automatic transmission.

### VARIANTS

Infantry fighting vehicle has three pintle-mounted 7.62mm MGs, one anti-tank rocket launcher.

Infantry combat vehicle as above but also carries 52mm mortar and night vision equipment.

TCM-20 AA fitted with one-man power-operated turret, armed



with twin 20mm cannon, to provide more stable firing platform, stabilisers lowered to ground before firing. Close-range anti-tank has 106mm M40 recoilless rifle. Long-range anti-tank has Raytheon Systems Company TOW ATGW launcher and two 7.62mm MGs. RAM V-2 AFV has fully enclosed troop compartment for crew of eight or ten, and can be fitted with wide range of weapon stations including 7.62mm and 12.7mm MGs and 40mm grenade launcher.

#### STATUS

Production as required. RAM and RBY series vehicles are in service with Botswana, Cameroon, Democratic Republic of Congo, Gabon, Guatemala, Israel, Lesotho and Morocco.

#### MANUFACTURER

RAMTA Structures and Systems, Israel Aircraft Industries, Beer Sheba, Israel.



*Above left: RAM V 1 with twin 7.62mm MG*

*Above: RAM TCM-20 AA (anti-aircraft)*

# FIAT OTOBREDA Type 6616 Armoured Car (Italy)

## KEY RECOGNITION FEATURES

- Nose slopes back under hull, well sloped glacis plate with driver's half-circular position on right side, turret centre
- Square turret with sides sloping slightly inwards, commander's cupola on left extends slightly over turret side, chamfer between turret front and sides
- Two large road wheels each side, horizontal louvers above both rear wheel stations, spare wheel often on hull rear, small hatch in lower part of hull side between wheels

## SPECIFICATIONS

|                         |                                                                                             |
|-------------------------|---------------------------------------------------------------------------------------------|
| Crew:                   | 3                                                                                           |
| Configuration^^         | 4x4                                                                                         |
| Armament:               | 1 x 20mm, 1 x 7.62mm MG (coaxial),<br>2 x 3 smoke grenade dischargers                       |
| Ammunition:             | 400 x 20mm, 1,000 x 7.62mm                                                                  |
| Length gun forwards:    | 5.37m                                                                                       |
| Length hull:            | 5.37m                                                                                       |
| Width:                  | 2.5m                                                                                        |
| Height:                 | 2.035m (turret roof)                                                                        |
| Ground clearance:       | 0.44m (hull centre), 0.37m (axles)                                                          |
| Wheelbase:              | 2.75m                                                                                       |
| Weight, combat:         | 8,000kg                                                                                     |
| Power-to-weight ratio:  | 20.20hp/tonne                                                                               |
| Engine:                 | Model 8062.24 supercharged liquid-cooled in-line diesel developing<br>_J^OjhjK3r^,200rpjT)_ |
| Maximum road speed:     | 100km/hr                                                                                    |
| Maximum water speed:    | 5km/hr                                                                                      |
| Maximum road range:     | 700km                                                                                       |
| Fuel[Capacity]          | 150 lit                                                                                     |
| £ordmc^__               | Amphibious                                                                                  |
| Vertical obstacle:      | 0.45m                                                                                       |
| Trench:                 | _Nlot^aEpicable__                                                                           |
| Gradient:               | 60%                                                                                         |
| Side slope:             | 30%                                                                                         |
| NBC system:             | Optional                                                                                    |
| Night vision equipment: | Optional                                                                                    |

## DEVELOPMENT

Type 6616 (4x4) is a joint development by FIAT and OTOBREDA and shares many components with Type 6614 (4x4) armoured

personnel carrier. FIAT is responsible for the hull, automotive components and final assembly; OTOBREDA for the complete two-man turret.

First prototype was completed in 1972 and first order placed by the Italian Carabinieri. Production was completed after about 300 vehicles had been built for the home and export markets.

The turret has full power traverse through 360° and the 20mm Rheinmetall MK 20 Rh 202 cannon elevates from -5° to +35°. The 7.62mm MG is mounted coaxial above the 20mm cannon. Type 6616 is fully amphibious, propelled by its wheels. Optional equipment includes 4,500kg capacity winch, NBC system, air-conditioning system and fire extinguishing system. A 106mm M40 recoilless rifle can be mounted on turret roof.

## VARIANTS

For trials purposes, the FIAT-OTOBREDA Type 6616 armoured car has been fitted with a number of different weapon systems as listed below but so far none of these has entered production for the Type 6616:

OTOBREDA OTO T 90 CKL turret armed with 90mm gun.

OTOBREDA turret armed with OTOBREDA 60mm High Velocity Gun System.

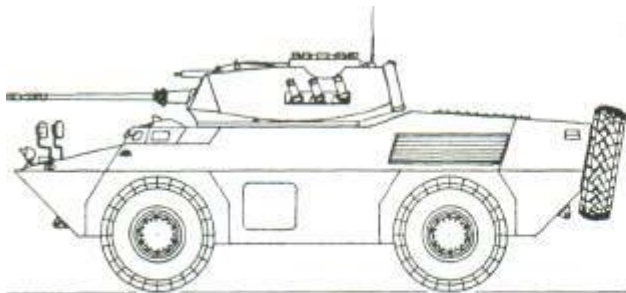
OTOBREDA turret armed with 25mm cannon and 7.62mm coaxial machine gun.

## STATUS

Production complete. In service with Italian Carabinieri, Peru, Somalia and other countries.

## MANUFACTURER

IVECO-FIAT, Bolzano, Italy.



*Above: Type 6616 (4x4)*

*Above right: Type 6616 (4x4)*

*Right: Type 6616 (4x4)*



# ivJLCO/OTOBREDA Puma APC (Italy)

## KEY RECOGNITION FEATURES

- Lower part of hull is vertical, well sloped glacis plate that leads up to horizontal roof, vertical hull rear with lower part sloping inwards. Upper sides of hull slope inwards. Headlamps are recessed into front of hull

- Driver's hatch front left of roof with commander's cupola in centre and small rectangular roof hatch at rear. Large door in hull rear

- Two large road wheels either side with large door in centre that opens forwards, all doors have firing port and associated vision block above

## SPECIFICATIONS

|                         |                                                                       |
|-------------------------|-----------------------------------------------------------------------|
| Crew:                   | 1+6                                                                   |
| Configuration:          | 4x4                                                                   |
| Armament:               | 1 x 7.62mm or 12.7mm MG,<br>2 x 3 smoke grenade dischargers           |
| Length:                 | 4.65m                                                                 |
| Width:                  | 2.085m                                                                |
| Height hull top:        | 1.67m                                                                 |
| Ground clearance:       | 0.392m                                                                |
| Weight, combat:         | 5,700kg                                                               |
| Power-to-weight ratio:  | 31.57hp/tonne                                                         |
| Engine:                 | IVECO Type 8042 TCA 4-cylinder diesel<br>developing 180hp at 3,000rpm |
| Maximum road speed:     | 105km/hr                                                              |
| Range:                  | 800km                                                                 |
| Fuel capacity:          | 150lit                                                                |
| Fording:                | Not available                                                         |
| Vertical obstacle:      | Not available                                                         |
| Trench:                 | Not available                                                         |
| Gradient:               | 60%                                                                   |
| Side slope:             | 30%                                                                   |
| Armour:                 | Classified                                                            |
| Armour, ty&ej           | Steel                                                                 |
| NBC system:             | Yes                                                                   |
| Night vision equipment: | Yes (passive)                                                         |

## DEVELOPMENT

IVECO/OTOBREDA has considerable experience in the design, development and production of wheeled armoured vehicles and the Puma family has been developed to meet the requirements of the Italian Army for a vehicle to operate with the IVECO/OTOBREDA Centauro (8x8) tank destroyer/armoured car (qv).

The first prototype of the Puma was completed in 1988 and by 1990 a total of five vehicles had been built. The Italian Army subsequently awarded the company a contract to build six specialised versions of the Puma, one each for the MILAN and TOW ATG/IV system, one for the Mistral SAM system, one 81mm mortar carrier, one ambulance and one command post vehicle. In 1966 the Italian Army placed an order for 150 Puma in 4x4 configuration.

The engine is at the front of the vehicle with the driver being seated towards the front on the left side and the troop compartment at the rear. Doors are provided in the sides and rear and on the roof is the commander's cupola that can be fitted with a 12.7mm or 7.62mm machine gun.

Standard equipment includes an integrated air conditioning system, fire detection and suppression system, power-operated winch, powered steering and run-flat tyres.

## VARIANTS

The 4x4 version of the Puma can be adopted for a wide range of roles in addition to those ordered by the Italian Army, for example NBC reconnaissance and internal security. More recently a 6x6 version of the Puma has been developed, this has the same automotive components as the Puma 4x4 including engine, automatic transmission and suspension and has a combat weight of 7,500kg. This version can carry eight men plus the driver and can be fitted with a wider range of armament stations. Its fuel capacity has been increased to 270 litres.

## STATUS

In production for Italian Army.

## MANUFACTURER

IVECO/OTOBREDA, Bolzano, Italy.





*Above: Puma (4x4) APC*

*Top right: Puma (4x4) APC with TOW*

*Right: Puma (6x6) APC*

(Italy)

## SPECIFICATIONS

Crew:

|                        |                                    |
|------------------------|------------------------------------|
| Configuration:         | 1+10                               |
| Armament:              | 4x4                                |
| Ammunition:            | 1 x 12.7mm MG                      |
| Length:                | 1,000 x 12.7mm                     |
| Width:                 | 5.86m                              |
| Height:                | 2.5m                               |
| Ground clearance:      | 1.78m (hull top), 2.18m (MG mount) |
| Wheelbase:             | 0.37m (axles)                      |
| Weight, combat:        | 2.9m                               |
| Power-to-weight ratio: | 8,500kg                            |
| Engine:                | 18.82hp/tonne                      |

|                         |                                                                                      |
|-------------------------|--------------------------------------------------------------------------------------|
| Maximum road speed:     | Model 8062.24 supercharged liquid-cooled in-line diesel developing 160hp at 3,200rpm |
| Maximum water speed:    | 100km/hr                                                                             |
| Maximum road range:     | 4.5km/hr                                                                             |
| Fuel capacity:          | 700km                                                                                |
| Fording:                | 142 lit                                                                              |
| Vertical obstacle:      | Amphibious                                                                           |
| Trench:                 | 0.4m                                                                                 |
| Gradient:               | Not applicable                                                                       |
| Side slope:             | 60%                                                                                  |
| Armour:                 | 30%                                                                                  |
| Armour type:            | 6 to 8mm                                                                             |
| NBC system:             | Steel                                                                                |
| Night vision equipment: | None                                                                                 |
|                         | Optional                                                                             |

## DEVELOPMENT

A joint development between FIAT and OTOBREDA, possible for hull and automotive components, latter

rear  
ty,  
Stand  
others:

Urrer twin, 62mm TM1A ent, nsta, at, ons such

## VARIANTS

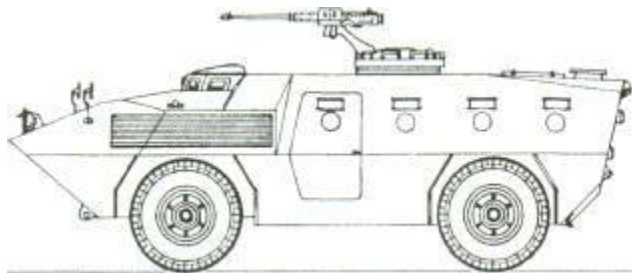
Type 6614 can be used for a wide range of security and reconnaissance. Projected variants: ambulance, cargo carrier, command post and

## STATUS

Production as required. In service with Argentine and Air Force, South Korea (licensed production), Tunisia and Venezuela.

## MANUFACTURERS

FIAT/OTOBREDA, Bolzano, Italy; Asia Motors Co., South Korea.



*Above: Type 6614 with 12.7mm MG*

*Right: Type 6614 armed with 12.7mm MG*

*Below: Type 6614 without armament (Richard Stickland)*



# Boneschi MAV 5 APC (Italy)

## KEY RECOGNITION

### FEATURES

- Box shaped hull with vertical hull front containing radiator and sloping bonnet which leads up to one piece windscreen which slopes slightly to rear

- Horizontal roof on which can be mounted a 7.62 mm machine gun, vertical hull rear, upper part of latter slopes slightly inwards with single piece door with firing port and window in upper part

- Upper part of hull sides slope slightly inwards with single door in each side between front and rear wheels with window in upper part. Two additional small windows in rear troop compartment either side with firing port below

## SPECIFICATIONS

|                         |                                             |
|-------------------------|---------------------------------------------|
| Crew:                   | 2 + 4                                       |
| Armament:               | 1 x 7.62mm MG (typical)                     |
| Ammunition:             | 1000 x 7.62mm (typical)                     |
| Length:                 | 4.66m                                       |
| Width:                  | 2.00m                                       |
| Height:                 | 2.15m                                       |
| Ground clearance:       | Not available                               |
| Weight, combat:         | 4,450kg                                     |
| Weight, empty:          | 3,850kg                                     |
| Power-to-weight ratio:  | 23.1hp/tonne                                |
| Ground pressure:        | Not available                               |
| Engine:                 | IVECO turbo charged diesel developing 103hp |
| Maximum road speed:     | 100km/h                                     |
| Maximum road range:     | 600km                                       |
| Fuel capacity:          | 751                                         |
| Fording:                | 0.70m                                       |
| Vertical obstacle:      | Not available                               |
| Trench:                 | Not available                               |
| Gradient:               | 60%                                         |
| Side slope:             | 30%                                         |
| Armour:                 | 6mm                                         |
| Armour type:            | Steel                                       |
| NBC system:             | No                                          |
| Night vision equipment: | No                                          |

The Italian Army has taken delivery of over 200 vehicles and these have been deployed overseas to such places as Albania, Bosnia, Kosovo and Somalia. The Italian Carabinieri has also taken delivery of a small quantity of vehicles.

The driver and commander are seated at the front of the vehicle with the engine forward and below their position thus leaving the area to the rear clear for the troop compartment. This has four individual seats that face the front, although other seating arrangements are possible.

In either side is a door that opens to the front while at the rear is a door that opens to the right. The standard production vehicle has a single roof hatch over which is mounted a 7.62mm machine gun although other armament options are possible. Standard equipment includes internal lighting and rifle racks while special equipment includes an air conditioning system, anti-tear gas filtering system, and a fire detection and suppression system for the engine compartment.

It can also be fitted with a more powerful engine as well as different types of tyres, including run-flat, exhaust brake and an air/electrical connection system for a trailer.

## VARIANTS

The MAV 5 can be fitted with additional armour to provide a higher level of protection against mines, these being called the MAV (MP). The basic vehicle can also be adopted for a number of specialist roles such as command post vehicle.

## DEVELOPMENT

The MAV 4 (4x4) light armoured vehicle has been developed by Carrozzeria Boneschi and IVECO and is essentially a IVECO 40.10 (4x4) truck chassis fitted with a fully armoured body that provides the occupants with protection from small arms fire and shell splinters.

## STATUS

Production as required. In service with Italy.

## MANUFACTURER

Carrozzeria Boneschi Srl, Milan, Italy.



*Above:*  
**MAV 5 APC**



*Top right:*  
**MAV 5 APC (Richard Stickland)**



*Right:*  
**MAV 5 APC (Richard Stickland)**

# 3P Aerospace and Vehicle Systems

## Multipurpose carrier/LBV (Netherlands)

### KEY RECOGNITION FEATURES

- Nose slopes back under vehicles with front of vehicle angled back at 45 degrees, horizontal roof extends to rear, vertical hull rear. Upper hull sides slope inwards.
- Large driver's windscreen at front with another window either side sloping to rear. Roof hatches in forward part of roof with engine louvres in roof at rear.
- Two large road wheels either side with large forward opening door in either side

### SPECIFICATIONS

|                         |                                                             |
|-------------------------|-------------------------------------------------------------|
| Crew:                   | 3                                                           |
| Qnfiguration^ ^         | 4 x 4                                                       |
| Armament:               | 1 x 7.62mm MG                                               |
| Ammunition:             | 1000 x 7.62mm                                               |
| Length:                 | 5.71 m                                                      |
| Width:                  | 2.49m                                                       |
| Height:                 | 1.79m                                                       |
| Weight, combat:         | J96rjOkci                                                   |
| Weight, empty:          | 7900J<2                                                     |
| Power-to-weight ratio:  | ^5hrV^                                                      |
| Engine:                 | 6-cylinder turbocharged intercooled diesel developing 240hp |
| Maximum road speed:     | 115km/hr                                                    |
| Maximum range:          | 800 km                                                      |
| Fuel capacity:          | Not available                                               |
| Fording:                | 1.0 mm                                                      |
| Vertical obstacle:      | Not available                                               |
| Trench:                 | Not available                                               |
| Gradient:               | 60%                                                         |
| Side slope:             | 35%                                                         |
| Armour:                 | Classified                                                  |
| Armour type:            | Aluminium                                                   |
| NBC system:             | Optional                                                    |
| Night vision equipment: | Optional                                                    |

### DEVELOPMENT

The Multipurpose carrier (MPC) has been developed as a private venture by SP Aerospace and Vehicle Systems with the first prototype being completed in 1992. It is designed to undertake

a wide range of military and paramilitary roles, with the former including command and control and battlefield surveillance.

The driver is seated at the front with bulletproof windows to his front and rear, providing the same level of protection as the hull. The other crew members, typically the commander and radio operator are seated in the centre. The powerpack is at the rear. A variety of weapons can be mounted on the roof, including machine guns, grenade launchers and ATGWs. Optional equipment includes an NBC system and an amphibious kit.

### VARIANTS

The LBV, another version of the MFC is being developed as a new reconnaissance vehicle for the Royal Netherlands army and the German army. Four prototypes have been built, two for each army. It is expected that the Dutch will take 220 vehicles and the Germans will order 216. SP Aerospace and Vehicle Systems are responsible for the vehicle with Krauss-Maffei Wegmann for systems integration.

The vehicle is normally referred to as the Fenneck by the Dutch and German armies.

### STATUS

Prototypes. Not yet in production or service.

### MANUFACTURER

SP Aerospace and Vehicle Systems, Geldrop, Netherlands





*Above: Fenneck  
(Netherlands Army)*



*Top right: Fenneck  
(German Army)*



*Right: Fenneck  
(Netherlands Army)*



# Chaimite APC (Portugal)

## KEY RECOGNITION FEATURES

- Similar in appearance to Cadillac Gage (4x4) range with four large road wheels, single two-part hatch in each side of hull between wheels, nose angled inwards, glacis well sloped then almost vertical to horizontal hull top that extends to rear
- Hull rear angled inwards at an angle of about 45°, engine in left hull rear with additional entry hatch to right
- Top half of hull above wheel hatches slopes slightly inwards, rectangular vision blocks with firing ports beneath

## SPECIFICATIONS

|                         |                                                                                |
|-------------------------|--------------------------------------------------------------------------------|
| Crew:                   | 11                                                                             |
| Configuration:          | 4x4                                                                            |
| Armament:               | See text                                                                       |
| Ammunition:             | See text                                                                       |
| Length:                 | 5.806m                                                                         |
| Width:                  | 2.26m                                                                          |
| Height:                 | J2.26mJnjmJ^rJx3EJ^                                                            |
| Ground clearance:       | 0.61m (hull)                                                                   |
| Wheelbase:              | 2.667m                                                                         |
| Weight, combat:         | 7r300kg                                                                        |
| Power-to-weight ratio:  | 32hj/tpnne                                                                     |
| Engine:                 | Model M75 V-8 water-cooled petrol developing 210hp at 4,000rpm (or V-6 diesel) |
| Maximum road speed:     | 110km/hr                                                                       |
| Maximum water speed:    | 9km/hr                                                                         |
| Maximum load range:     | 1050km                                                                         |
| Fuel capacity:          | 300 lit                                                                        |
| Fording:                | Amphibious                                                                     |
| Vertical obstacle:      | 0.9m                                                                           |
| Trench:                 | Not applicable                                                                 |
| Gradient:               | 65%                                                                            |
| Side slope:             | 40%                                                                            |
| Armour:                 | 7.94mm (maximum)                                                               |
| Armour type:            | Steel                                                                          |
| NBC system:             | None                                                                           |
| Night vision equipment: | Optional                                                                       |

## DEVELOPMENT

Chaimite range of 4x4s was designed by BRAVIA to meet requirements of the Portuguese armed forces, first prototype

completed in 1966 and production commencing soon afterwards. In appearance Chaimite is very similar to the Cadillac Gage (now Textron Marine ft Land Systems) LAV-150 and AV Technology Corporation Dragoon families of 4x4 vehicles. Both of these have their own entry in this section.

Crew number depends on mission but typically could be 11: commander, driver, gunner and eight fully equipped infantry. Chaimite is fully amphibious, propelled by its wheels. Standard equipment includes a front-mounted winch with capacity of 4,530kg, optional equipment includes night vision equipment.

## VARIANTS

V-200 is basic vehicle normally fitted with a one-man MG turret, twin 7.62mm MG with 500 rounds of ready-use ammunition (250 per gun), 9,000 carried in reserve in hull, or turret with one 12.7mm and one 7.62mm MG.

V-300 can be fitted with variety of 20mm turrets.

V-400 can be fitted with 90mm turrets.

V-500, command and communications vehicle.

V-600, 81mm or 120mm mortar carrier.

V-700, ATGW vehicle.

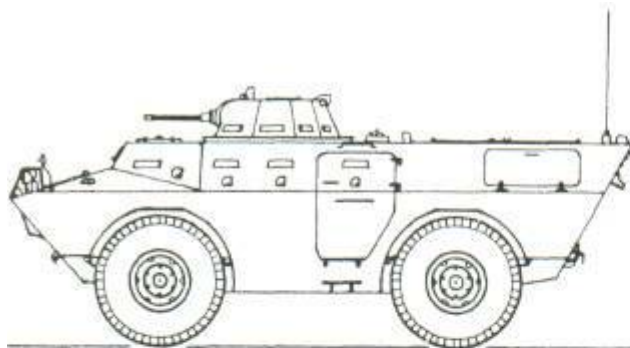
V-800, unarmed ambulance.

V-900, crash rescue vehicle.

V-1000, riot control/internal security vehicle.

A 6x6 version, BRA VIA Mk II, was projected but as far as is known this never entered production or service.

BRAVIA has also stated that there is an 8x8 BRAVIA Mk III APC but this has never entered production or service. BRAVIA has also designed and built the Tigre Mk II (6x6) APC which is essentially a truck with an armoured body.



# **STATUS**

Production as required. Known to be in service with Lebanon, Libya (status uncertain), Peru, Philippines and Portugal.

# **MANUFACTURER**

BRAVIA SARL, Lisbon, Portugal.

*Top: Chaimite V-200 with twin 7.62mm MG turret*

*Right: Chaimite V-400*

*Above right: Chaimite V-200 with 12.7mm and 7.62mm MG turret*

#



## KEY RECOGNITION FEATURES

- Box type hull with nose sloping back under hull front, trim vane folds back onto glacis plate, two windows in hull front with shutters above, horizontal hull top, vertical hull rear
- Upper part of hull slopes slightly inwards as does lower half, two large wheels either side with door in lower half of hull
- Turret mounted towards front of vehicle has flat top and well sloped sides

## SPECIFICATIONS

|                         |                                      |
|-------------------------|--------------------------------------|
| Crew:                   | 3+4                                  |
| Configuration:          | 4x4                                  |
| Armament:               | 1 x 14.5mm MG, 1 x 7.62mm MG         |
| Ammunition:             | 500 x 14.5mm, 2,000 x 7.62mm         |
| Length:                 | 5.64m                                |
| Width:                  | 2.805m                               |
| Height:                 | 2.335m (with turret)                 |
| Ground clearance:       | 0.485m                               |
| Wheelbase:              | 2.9m                                 |
| Weight, combat:         | 9275kg                               |
| Weight, empty:          | 8575kg                               |
| Power-to-weight ratio:  | 16.66hp/tonne                        |
| Engine:                 | Turbocharged diesel developing 154hp |
| Maximum road speed:     | 85km/hr                              |
| Maximum road range:     | 700km                                |
| Fuel capacity:          | Not available                        |
| Fording:                | Amphibious                           |
| Vertical obstacle:      | 0.3m                                 |
| Trench:                 | 0.70m                                |
| Gradient:               | 60%                                  |
| Side slope:             | 30%                                  |
| Armour:                 | 8mm (maximum)(estimate)              |
| Armour type:            | Steel                                |
| NBC system:             | Yes                                  |
| Night vision equipment: | Yes                                  |

## DEVELOPMENT

The TAB-79 (4x4) APC was developed specifically to meet the requirements of the Romanian Army and uses some automotive components of the TAB-77 (8x8) APC.

The driver is seated at the front of the vehicle on the left with the vehicle commander to his right. Mounted on the roof to the rear of the commander's and driver's position is the one-man manually operated turret which is the same as that fitted to the TAB-71M (8x8), TAB-77 (8x8) and the Mountaineers Combat Vehicle. This is armed with one 14.5mm and one 7.62mm machine gun with total ammunition capacity being 500 rounds of 14.5mm and 2,000 rounds of 7.62mm.

The engine compartment is at the rear of the vehicle on the left side and in addition to the entry doors in either side there is also a door in the hull rear on the right side as well as a single roof hatch.

Standard equipment includes infra-red night vision equipment and an NBC system. The TAB-79 (4x4) APC is fully amphibious being propelled in the water by a single waterjet mounted at the rear of the hull. Before entering the water the bilge pumps are switched on and the trim vane erected at the front of the hull. When not required this lays back on the glacis plate.

## VARIANTS

TAB-79A PCOMA, armoured artillery observation post vehicle, armed with 7.62mm machine gun.

TAB-79R, self-propelled 82mm mortar system which can also be deployed away from the vehicle if required.

TABRCH-84, armoured chemical and radiological reconnaissance vehicle, no turret, fitted with racks of pennants to mark contaminated areas. Armed with 7.62mm pintle-mounted machine gun.

TCG-80, this is an unidentified variant, may be a recovery vehicle.

AM 425, latest version of TAB-79 APC

The chassis is used as basis for Romanian equivalent of the Russian SA-9 SAM, the A95.

**STATUS**

Production complete. In service with Romania.

**MANUFACTURER**

RATMIL RA.

*Right: TABC-79 (4x4)  
APC (Paul Beaver)*



# J5RDM-1 Amphibious Scout Car (Russia)

## KEY RECOGNITION FEATURES

- Pointed nose containing engine slopes upwards towards crew compartment that extends almost to rear of vehicle. Only means of entry and exit via roof hatches
- Hull sides and rear vertical, but front, sides and rear of crew compartment slope inwards with two armoured covers on front and two firing ports in sides
- On each side of hull between roadwheels are two belly wheels that are raised when travelling on roads. Trim vane under nose when not in use

## SPECIFICATIONS

|                         |                                                                            |
|-------------------------|----------------------------------------------------------------------------|
| Crew:                   | 5                                                                          |
| Configuration:          | 4x4                                                                        |
| Armament:               | 1 x 7.62mm MG                                                              |
| Ammunition:             | 1,250 x 7.62mm                                                             |
| Length:                 | 5.7m                                                                       |
| Width:                  | 2.25m                                                                      |
| Height:                 | 1.9m (without MG)                                                          |
| Ground clearance:       | 0.315m                                                                     |
| Wheelbase:              | 2.8m                                                                       |
| Weight, combat:         | 5,600kg                                                                    |
| Power-to-weight ratio:  | 16.7hp/tonne                                                               |
| Engine:                 | GAZ-40P 6-cylinder water-cooled in-line petrol developing 90hp at 3,400rpm |
| Maximum road speed:     | 80km/hr                                                                    |
| Maximum water speed:    | 9km/hr                                                                     |
| Road range:             | 500km                                                                      |
| Fuel capacity:          | 150 lit                                                                    |
| Fording <sup>a</sup> :  | Amphibious                                                                 |
| Vertical obstacle:      | 0.4m                                                                       |
| Trench:                 | 1.22m                                                                      |
| Gradient:               | 60%                                                                        |
| Side slope:             | 30%                                                                        |
| Armour:                 | 10mm (maximum)                                                             |
| Armour type:            | Steel                                                                      |
| NBC system:             | None                                                                       |
| Night vision equipment: | Yes (infra-red for driver only)                                            |

## DEVELOPMENT

BRDM-1 (4x4) was developed in the mid-1950s and entered service with the Russian Army in 1957, but it has been replaced

in all front-line Russian units by the later BRDM-2 (4x4) amphibious reconnaissance vehicle.

BRDM-1 is fully amphibious, propelled by a single waterjet mounted at hull rear. Before entering a trim vane is erected at hull front and bilge pumps switched on. On each side of hull, between road wheels, is a set of powered belly wheels that are lowered to the ground to improve cross-country mobility. Tyre pressure regulation system is fitted as standard.

Typical armament comprises 12.7mm DShKM MG at front and 7.62mm SGMB MG at rear of crew compartment.

## VARIANTS

BRDM-1 Model 1957 had open roof, but only a few were built. BRDM-1 Model 1958 is the most common, with enclosed roof and hatches.

BRDM-U is command model with four radio antennas compared with one in standard vehicle.

BRDM-RKhB radiological-chemical reconnaissance vehicle has two rectangular packs at rear for dispensing poles with pennants. BRDM-1 with three Snapper ATGWs which are raised from inside for launching; rarely seen today.

BRDM-1 with four Swatter ATGWs which are raised from inside for launching; rarely seen today.

BRDM-1 with six Sagger ATGWs which are raised from inside, complete with overhead armour protection; rarely seen today.

## STATUS

Production complete. In service with Afghanistan, Albania, Bulgaria, Congo, Cuba, Guinea, Kazakhstan, Mozambique, Sudan, Vietnam and Zambia. In most of these countries the vehicle is now found in reserve units.

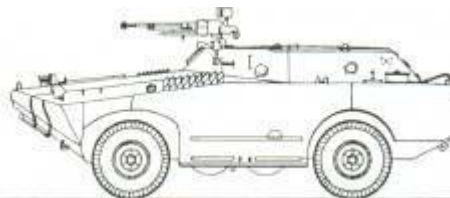


**MANUFACTURER**

Molotov GAZ plant, Gorkiy, former USSR.

*Right: BRDM-1 (4x4)*

*Below: BRDM-1 (4x4) amphibious scout car with 7.62mm  
MGs installed*



# BRDM-2 Amphibious Scout Car (Russia)

## KEY RECOGNITION FEATURES

- Lower part of hull has vertical sides and rear, upper part slopes inwards, engine compartment roof slopes down to rear

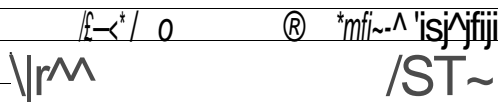
- Belly wheels raised when travelling on roads, trim vane under nose when not required

- Turret on centre of hull roof with flat top. Only means of entry and exit via two circular hatches forward of turret

## SPECIFICATIONS

|                         |                                                             |
|-------------------------|-------------------------------------------------------------|
| Crew:                   | 4                                                           |
| Configuration:          | 4x4                                                         |
| Armament:               | 1 x 14.5mm MG (main), 1 x 7.62mm MG (coaxial)               |
| Ammunition:             | 500 x 14.5mm, 2,000 7.62mm                                  |
| Length:                 | 5.75m                                                       |
| Width:                  | 2.35m                                                       |
| Height:                 | 2.31m                                                       |
| Ground clearance:       | 0.43m                                                       |
| Wheelbase:              | 3.1m                                                        |
| Weight, combat:         | 7,000kg                                                     |
| Power-to-weight ratio:  | 20hp/tonne                                                  |
| Engine:                 | GAZ-41 V-8 water-cooled petrol developing 140hp at 3,400rpm |
| Maximum road speed:     | 100km/hr                                                    |
| Maximum water speed:    | 10km/hr                                                     |
| Road range:             | 750km                                                       |
| Fuel capacity:          | 290 lit                                                     |
| Fording:                | Amphibious                                                  |
| Vertical obstacle:      | 0.4m                                                        |
| Trench:                 | 1.25m                                                       |
| Gradient:               | 60%                                                         |
| Side slope:             | 30%                                                         |
| Armour:                 | 3-7mm                                                       |
| Armour type:            | Steel                                                       |
| NBC system:             | Yes                                                         |
| Night vision equipment: | Yes (driver and commander, infra-red)                       |

BRDM-2 (4x4)



## DEVELOPMENT

BRDM-2 was developed as the replacement for the BRDM-1 (4x4) and was first seen in public during 1966. Main improvements are better road and cross-country performance, heavier armament in fully enclosed turret, more powerful rear-mounted engine, improved amphibious capabilities, NBC system and night vision equipment.

Commander and driver sit side-by-side at front with roof hatch behind. Turret is the same as on the OT-64 Model 2A (8x8), BTR-70 and BTR-60PB (8x8) armoured personnel carriers and has no roof hatch. The 14.5mm KPVT MG is mounted on left with 7.62mm PKT MG right; both have manual elevation from -5° to +30° and manual traverse through 360°.

Standard equipment on all BRDM-2s includes central tyre pressure system, decontamination kit, winch and land navigation system. Two powered belly wheels can be lowered to the ground each side to improve cross-country mobility.

## VARIANTS

BRDM-2-RKhb radiological-chemical reconnaissance vehicle has two rectangular racks, one each side at rear, which dispense lane marking poles with pennants.

BRDM-2U command vehicle retains turret of BRDM-2 but has additional communications equipment.

BRDM-2U command vehicle normally has turret replaced by small roof-mounted generator and two roof-mounted antennas.

SA-9 Gaskin SAM system is based on BRDM-2 chassis.

BRDM-2 with Sagger ATGWs (see TDs).

BRDM-2 with Spandrel ATGWs (see TDs).

BRDM-2 with Swatter ATGWs (see TDs).

#### STATUS

Production complete. In service with Afghanistan, Algeria, Angola, Benin, Bulgaria, Burundi, Cape Verde Islands, Congo, Croatia, Cuba, Czech Republic, Egypt, Equatorial Guinea, Estonia, Ethiopia, Gaza, Guinea, Guinea-Bissau, Hungary, India, Indonesia, Iraq, Kazakhstan, Kyrgystan, Latvia, Libya, Lithuania, Macedonia, Madagascar, Malawi, Mali, Mauritania, Mongolia, Mozambique, Namibia, Nicaragua, Peru, Poland, Romania, Russia, Seychelles, Slovakia, Slovenia, Somalia, Sudan, Syria, Tanzania, Turkmenistan, Ukraine, Uzbekistan, Vietnam, Yemen, Yugoslavia and Zambia

#### MANUFACTURER

Molotov GAZ Plant, Gorkiy, former USSR.



*Above: BRDM-2 with commander's and driver's hatches open (Richard Strickland)*

## URDM-2 ATGW versions (Russia)

### KEY RECOGNITION FEATURES

- Hull identical to BRDM-2 (4x4) amphibious scout car except turret replaced by retractable launcher for six Sagger ATGWs
- When in action six-round Sagger launcher complete with overhead armour protection is raised above hull roof
- Gunner's sight protrudes from hull roof to right of driver

### SPECIFICATIONS (BRDM-2 SAGGER)

|                         |                                                             |
|-------------------------|-------------------------------------------------------------|
| Crew:                   | 2-3                                                         |
| Configuration:          | 4x4                                                         |
| Armament:               | Launcher with 6 Sagger ATGW                                 |
| Ammunition:             | 14 x Sagger ATGW (total)                                    |
| Length:                 | 5.75m                                                       |
| Width:                  | 2.35m                                                       |
| Height:                 | 2.01m (launcher retracted)                                  |
| Ground clearance:       | 0.43m                                                       |
| Wheelbase:              | 3.1m                                                        |
| Weight, combat:         | 7,000kg                                                     |
| Power-to-weight ratio:  | 20hp/tonne                                                  |
| Engine:                 | GAZ-41 V-8 water-cooled petrol developing 140hp at 3,400rpm |
| Maximum speed:          | 100km/hr                                                    |
| Maximum water speed:    | 10km/hr                                                     |
| Maximum road range:     | 750km                                                       |
| Fuel capacity:          | 290 lit                                                     |
| Fording:                | Amphibious                                                  |
| Vertical obstacle:      | 0.4m                                                        |
| Trench:                 | 1.25m                                                       |
| Gradient:               | 60%                                                         |
| Side slope:             | 30%                                                         |
| Armour:                 | 14mm (maximum)                                              |
| Armour type:            | Steel                                                       |
| NBC system:             | Yes                                                         |
| Night vision equipment: | Infra-red (driver)                                          |

### DEVELOPMENT

BRDM-2 Sagger was developed in the late 1960s to replace versions of the earlier BRDM-1 with Snapper, Swatter of Sagger ATGWs. First used operationally by Egypt and Syrian Army in

1973 Middle East conflict. Automotively, BRDM-2 (Sagger) is identical to standard BRDM-2 amphibious scout vehicle. Fully amphibious, propelled by single waterjet mounted in hull rear, central tyre pressure regulation system, and between road wheels each side are two powered belly wheels lowered to ground when vehicle is crossing rough ground.

When in firing position the six-round Sagger launcher, complete with overhead armour protection, is raised above roof of vehicle and missiles can be launched from inside vehicle or up to 80 m away with the aid of a separation sight and cable. Further eight missiles carried internally for manual reloading. Sagger has maximum range of 3,000rpm. In 1977 Sagger was being converted from its normal wire command guidance system to a semi-automatic infra-red system.

### VARIANTS

6RDM-2 with Spandrel ATGWs, first seen in 1977, has five AT-5 Spandrel ATGWs in ready-to-launch position on roof, a further 10 being carried internally. AT-5 Spandrel has range of 4,000 m; gunner keeps cross-hair of sight on target to ensure a hit. Some BRDM-2s (Spandrel) have been seen with two AT-4 Spigot (right) and three AT-5 Spandrel (left) ATGI/V in the ready-to-launch position.

BRDM-2 with Swatter-C ATGW, first seen in 1973, has quadruple launcher for AT-2 Swatter converted from original radio-to-line-of-sight to semi-active infra-red command guidance.

### STATUS

Production complete. Known users of 6RDM-2 Sagger include Algeria, Czech Republic, Egypt, Hungary, Iraq, Libya, Morocco, Nicaragua, Poland, Romania, Russia, Slovakia, Syria and former Yugoslavia.

**MANUFACTURER**

Molotov GAZ plant, Gorkiy, former  
USSR.



*Above: BRDM-2 (Spandrel)*

*Left: BRDM-2  
(Spigot and Spandrel)*

## ^ AJAJK-4UAPC (Russia)

### KEY RECOGNITION FEATURES

- Engine front with open-topped troop compartment rear, firing ports each side and entry door at rear which normally has spare wheel and tyre
- Armoured air intake grille under nose, engine compartment roof sloping up towards commander's and driver's flap that can be locked in horizontal open position

### SPECIFICATIONS

|                         |                                                                           |
|-------------------------|---------------------------------------------------------------------------|
| Crew:                   | 2+8                                                                       |
| Configuration:          | 4x4                                                                       |
| Armament:               | 1 x 7.62mm MG                                                             |
| Ammunition:             | 1,250 x 7.62mm                                                            |
| Length:                 | 5m                                                                        |
| Width:                  | 1.9m                                                                      |
| Height:                 | 1.75m (without armament)                                                  |
| Ground clearance:       | 0.275m                                                                    |
| Wheelbase:              | 2.7m                                                                      |
| Weight, combat:         | 5,300kg                                                                   |
| Power-to-weight ratio:  | 15hp/tonne                                                                |
| Engine:                 | GAZ-40 6-cylinder water-cooled in-line petrol developing 80hp at 3,400rpm |
| Maximum road speed:     | 80km/hr                                                                   |
| Range:                  | 285km                                                                     |
| Fuel capacity:          | 120 lit                                                                   |
| Fording:                | 0.8m                                                                      |
| Vertical obstacle:      | 0.47m                                                                     |
| Trench:                 | 0.7m (with channels)                                                      |
| Gradient:               | 60%                                                                       |
| Side slope:             | 30%                                                                       |
| Armour:                 | 8mm (maximum)                                                             |
| Armour type:            | Steel                                                                     |
| NBC system:             | None                                                                      |
| Night vision equipment: | Yes (driver only, infra-red)                                              |

### DEVELOPMENT

BTR-40 was developed from 1944, essentially a lengthened and modified GAZ-63 (4x4) truck chassis with fully armoured body.

Entered service with the former Soviet Army in 1950 and used both as ARC and command and reconnaissance vehicle; in the latter role it was replaced in the late 1950s by BRDM-1 (4x4) which had better cross-country mobility and was fully amphibious. Three pintle mounts for MGs round hull top.

In the former Soviet Army the BTR-40 was often referred to as the Sorokovke. As far as it is known, none remain in front line service with the former Soviet Army.

### VARIANTS

Original version did not have firing ports. Models built from the 1950s were designated BTR-40V and have central tyre pressure regulation system. Some BTR-40s have 4,500kg winch mounted at front of vehicle.

BTR-40A anti-aircraft vehicle has same turret as BTR-152A armed with twin 14.5mm MGs; no longer in front line Soviet service.

BTR-40B APC has overhead armour protection for troop compartment, carries six troops plus two-man crew.

BTR-40Kh is chemical reconnaissance vehicle with equipment at rear to dispense marking pennants.

BTR-40 zhd has steel wheels for running on railway lines.

### STATUS

Production complete. In service with Afghanistan, Burundi, Cuba, Guinea, Guinea-Bissau, Indonesia, North Korea, Laos, Mali, Mozambique, Syria, Tanzania, Vietnam and Yemen. In many of these countries the vehicle is in second line use, often with militia units.

### MANUFACTURER

Russian state arsenals.



Above: BTR-40 (Michael Jerchel)



# BOV-VP APC (Slovenia)

## KEY RECOGNITION FEATURES

- Nose angled at 45° with slightly sloped glacis plate leading up to almost vertical windscreen for commander and driver, horizontal roof for crew compartment drops down to rear in line with back wheels
- Cupola in middle of roof with externally mounted 12.7mm MG, *upper part of troop compartment sides has rectangular windows with circular firing ports between*
- Two large road wheels each side with hull sides sloping inwards from just above wheel arches

## SPECIFICATIONS

|                         |                                                                      |
|-------------------------|----------------------------------------------------------------------|
| Crew:                   | 2+8                                                                  |
| Configuration:          | 4x4                                                                  |
| Armament:               | 1 x 7.62mm MG, 2 x 3 smoke grenade dischargers                       |
| Length:                 | 5.7m                                                                 |
| Width:                  | 2.534m                                                               |
| Height:                 | 2.335m (hull roof)<br>1.99m (hull top)                               |
| Ground clearance:       | 0.325m                                                               |
| Wheelbase:              | 2.75m                                                                |
| Weight, combat:         | 13,490kg                                                             |
| Power-to-weight ratio:  | 15.94hp/t                                                            |
| Engine:                 | Deutz type F 61 413 F 6-cylinder diesel developing 150hp at 2,650rpm |
| Max speed:              | 95km/hr                                                              |
| Range:                  | 500km                                                                |
| Fuel capacity:          | 220 lit                                                              |
| Fording:                | 1.1m                                                                 |
| Vertical obstacle:      | 0.54m                                                                |
| Trench:                 | 0.64m                                                                |
| Gradient:               | 55%                                                                  |
| Side slope:             | 30%                                                                  |
| Armour:                 | 8mm (Maximum)(estimate)                                              |
| NBC system:             | No                                                                   |
| Night vision equipment: | Yes (infra-red for driver)                                           |

## DEVELOPMENT

In the early 1980s Yugoslavia introduced the first of what was to become a family of 4x4 armoured vehicles using many commercial automotive components such as engine,

transmission and suspension. In many respects this series, known as BOV, is similar to the US LAV-150 series multi-mission vehicle developed in the 1960s and since built in large numbers, mainly for export.

BOV-VP APC has commander and driver front, each provided with a roof hatch, raised troop compartment centre, engine and transmission rear. Troops normally enter and leave via door in side of hull between road wheels. Armament comprises 7.62mm pintle-mounted MG with bank of three electrically operated smoke grenade dischargers mounted on hull side firing forwards.

Standard equipment includes day/night vision equipment, heater and communications equipment. Some BOV-VP vehicles have been fitted with wire mesh screens along side of the hull that folds forwards through 90 degrees when required.

## VARIANTS

BOV-1 is anti-tank version. Mounted on hull roof are two pods, each containing three ATGWs based on Soviet AT-3 Sagger but fitted with semi-automatic guidance system.

BOV-3 triple 20mm SPAAG system.

BOV-30 twin 30mm SPAAG system.

## STATUS

Production complete. In service with Croatia, Slovenia, Yugoslavia.

## MANUFACTURER

MPP Vozila d.o.o., Slovenia.



*Above;  
BOV-3 triple 20mm SPAAG*

*Right:  
BOV-1 anti-tank vehicle*



# Reumech OMC Mamba Mk II APC (South Africa)

## KEY RECOGNITION FEATURES

- Vertical hull front with grill in centre, long horizontal bonnet which slopes slightly upwards, then almost vertical bullet proof windscreen, horizontal roof with eight hatches
- Hull sides vertical with large bullet proof windows in sides and rear, large door in rear. Side and rear windows have firing ports
- Two large road wheels either side with spare wheel carried on left side of hull

## SPECIFICATIONS

|                         |                                                                                  |
|-------------------------|----------------------------------------------------------------------------------|
| Crew:                   | 2 + 9                                                                            |
| Configuration:          | 4 x 4                                                                            |
| Armament:               | 1 x 12.7 mm MG (optional)                                                        |
| Length:                 | 5.46 m                                                                           |
| Width:                  | 2.205 m                                                                          |
| Height:                 | 2.495 m                                                                          |
| Ground clearance:       | 0.39 m                                                                           |
| Wheelbase:              | 2.90m                                                                            |
| Weight, combat:         | 6800 kg                                                                          |
| Weight, empty:          | 5710 kg                                                                          |
| Power-to-weight ratio:  | 18.08 hp/t                                                                       |
| Engine:                 | Daimler-Benz OM 352 6-cylinder water-cooled diesel developing 123 hp at 2800 rpm |
| Maximum road speed:     | 102 km/h                                                                         |
| Maximum road range:     | 900 km                                                                           |
| Fuel capacity:          | 200 lit                                                                          |
| Fording:                | 1 m                                                                              |
| Vertical obstacle:      | 0.4 m                                                                            |
| Trench:                 | 0.9 m                                                                            |
| Gradient:               | 60%                                                                              |
| Side slope:             | 40%                                                                              |
| Armour:                 | classified                                                                       |
| Armour type:            | steel                                                                            |
| NBC:                    | no                                                                               |
| Night vision equipment: | no                                                                               |

## DEVELOPMENT

The first Mamba was a 4 x 2 vehicle and was produced in significant numbers for a variety of missions. Further development by Reumech OMC resulted in the Mamba Mk II which has a number of improvements including 4 x 4 drive and a higher ground clearance. The hull of the Mamba Mk II is V-shaped to provide a high level of protection against anti-tank mines. Wherever possible standard UNIMOG components are used in the design of the vehicle.

The engine compartment is at the front with the commander and driver in the centre and the troop compartment extending right to the rear. Only means of entry is via the large door in the rear of the hull and the roof hatches. Bullet proof windows are fitted all round and these provide the same level of protection as the armoured hull.

The basic model is unarmed although various weapon systems can be fitted. Alvis has a licence to produce a similar version which they call the Alvis 8 with short wheelbase version being Alvis 4.

## VARIANTS

Projected roles include ambulance, command post vehicle, utility vehicle, recovery, VIP transport and logistics support. Can be fitted with various weapons including machine guns.

## STATUS

In production. In service with South African National Defence Force.

## MANUFACTURER

Reumech OMC, Benoni, South Africa.



*Top left: Mamba II (4 x 4) APC  
Left: Mamba II (4 x 4) APC (Christopher F Foss)  
Above: Mamba II (4 x 4) APC*

# Reumech OMC Casspir Mk III APC (South Africa)

## KEY RECOGNITION FEATURES

- Lower part of hull is V-shaped with upper part of hull sides and rear vertical, single wheel at each end of the vehicle outside of the armour envelope
- Bonnet type engine compartment at the front with horizontal engine louvres with chamfer between sides and top, large bullet-proof windows at front and along sides of hull. The bullet-proof windows along sides towards rear have firing ports below
- Horizontal hull top with forward part armoured and often mounting a 7.62mm machine gun, early models had open roof but late production models had fully enclosed rear troop compartment, twin doors in rear

## SPECIFICATIONS

|                         |                                                          |
|-------------------------|----------------------------------------------------------|
| Crew:                   | 2 + 10                                                   |
| Configuration:          | 4x4                                                      |
| Armament:               | 1 to 3 7.62mm MGs                                        |
| Length:                 | 6.87m                                                    |
| Width:                  | 2.5m                                                     |
| Height:                 | 2.85m                                                    |
| Ground clearance:       | 0.41m (axles)                                            |
| Weight, combat:         | 12,580kg                                                 |
| Weight, empty:          | 11,040kg                                                 |
| Power-to-weight ratio:  | 13.51hp/tonne                                            |
| Engine:                 | ADE-352T, 6-cylinder diesel developing 170hp at 2,800rpm |
| Maximum road speed:     | 90km/hr                                                  |
| Maximum road range:     | 850km                                                    |
| Fuel capacity:          | 220 lit                                                  |
| Fording:                | 1.0m                                                     |
| Vertical obstacle:      | 0.5m                                                     |
| Trench:                 | 1.06m                                                    |
| Gradient:               | 65%                                                      |
| Side slope:             | 40%                                                      |
| Armour:                 | Classified                                               |
| Armour type:            | Steel                                                    |
| NBC system:             | None                                                     |
| Night vision equipment: | None                                                     |

## DEVELOPMENT

The original Casspir family of vehicles was developed in the late 1970s but from 1981 production was undertaken by TFM which has since developed the Casspir Mk II and Mk III vehicles of which well over 2,000 have been built. Although designed mainly for internal security operations, it has been used for

offensive operations in Southern Africa. A unique feature of the Casspir is that it has been designed to give its crew a high degree of protection against anti-tank mines and for this reason the vehicle has a very high ground clearance with the hull having a V-shape to help deflect the blast from any mines. The large cross-country wheels are outside of the main armour envelope.

There have been three main models of the Casspir, the Mk 1, Mk II and Mk III, all of which have incorporated improvements as a result of operational experience. Wherever possible standard commercial components are used in the construction of the Casspir family of vehicles.

The engine compartment is at the front, commander and driver to the immediate rear with the troop compartment extending right to the rear. The troops are seated five either side facing each other. There are minor differences between production runs and there are a number of local modifications.

Standard equipment includes long range fuel tank, drinking water tank, two spare wheels and tyres and fire extinguishers.

Optional equipment includes floodlights, searchlights and obstacle clearing equipment. As well as the 7.62mm MGs, a rubber bullet launcher can be fitted.

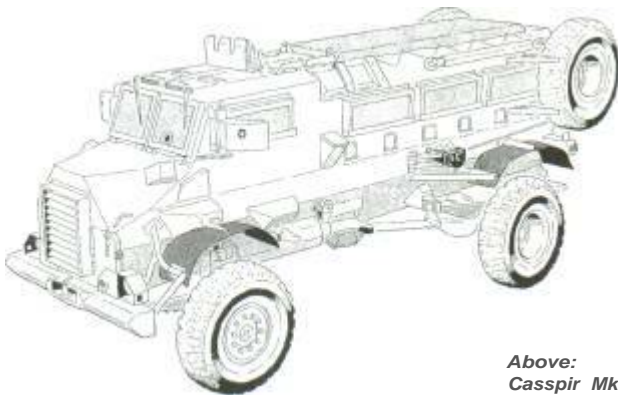
The original manufacturer was TFM but this company has been taken over by Reumech OMC.

## VARIANTS

Blesbok, this is a cargo carrier and retains the fully armoured cab.

Duiker, this is a 5,000 litre fuel tanker and retains the fully armoured cab.

Gemsbok, recovery vehicle with recovery equipment at very rear of hull and fitted with extended armoured cab.



*Above:  
Casspir Mk  
III ARC*



*Top right:  
Casspir Mk  
III APC  
(Christopher  
F Foss)*

*Right:  
Casspir Mk  
III APC*

Ambulance, similar to Casspir Mk III ARC but modified for ambulance role.

Police, increased visibility.

Artillery fire control.

Mine clearing, two versions.

Mine sensor vehicle.

81mm mortar.

106mm recoilless rifle.

## **STATUS**

Production as required. In service with Angola, India, Namibia, Peru, South Africa and Uganda.

## **MANUFACTURER**

Reumech OMC, Benoni, South Africa.

# Reumech OMC RG-12 Patrol APC (South Africa)

## KEY RECOGNITION FEATURES

- Box type hull with sloping windscreen at front, vertical hull sides and rear, horizontal radiator grille in centre of hull front
- Large square windows in front, sides and rear of vehicle that are usually covered by wire mesh screens, two doors in each side of vehicle, one over first road wheel and one between road wheels
- Total of four road wheels which are at extreme ends of vehicle, horizontal roof raised for air conditioning system

## SPECIFICATIONS

|                                |                                           |
|--------------------------------|-------------------------------------------|
| Crew:                          | 2-11                                      |
| <u>Configuration:</u>          | 4x4                                       |
| <u>Length:</u>                 | 5.2m                                      |
| Width:                         | 2.45m                                     |
| <u>Height:</u>                 | 2.64m                                     |
| Ground clearance:              | 0.322m                                    |
| <u>Weight, combat:</u>         | 9,200kg                                   |
| <u>Weight, empty:</u>          | 7,420kg                                   |
| <u>Power-to-weight ratio:</u>  | 18.4hp/tonne                              |
| Engine:                        | ADET366 diesel<br><u>developing 170hp</u> |
| <u>Maximum road speed:</u>     | 100km/hr                                  |
| Range:                         | 1000km                                    |
| <u>Fuel capacity:</u>          | 250 lit                                   |
| <u>Fording:</u>                | Not available                             |
| Vertical obstacle:             | Not available                             |
| Trench:                        | Not available                             |
| Gradient:                      | 50%                                       |
| Side slope:                    | 40%                                       |
| Armour:                        | Classified                                |
| <u>Armour type:</u>            | Steel                                     |
| <u>NBC system:</u>             | None                                      |
| <u>Night vision equipment:</u> | None                                      |

## DEVELOPMENT

The RG-12 patrol armoured personnel carrier was developed as a private venture by the TFM company (now part of Reumech OMC) which also manufactures the Casspir (4x4) range of armoured personnel carriers (qv). The first prototypes were completed early in 1990 with first production vehicles being completed later the same year.



RG-12 APC

The RG-12 is designed mainly for internal security operations and wherever possible standard commercial components are used in the construction of the vehicle. Both 4x4 and 4x2 versions of the RG-12 were manufactured.

The complete powerpack is mounted at the front of the vehicle with the commander being seated on the left and the driver on the right, each being provided with a forward opening door. The three troops are seated either side facing outwards and enter and leave the vehicle via door in the side that can be rapidly opened. In addition there is a door in the rear that gives access to the spare wheel and storage. A tropical roof is fitted and a roof hatch is provided above the commander's seat.

Standard equipment includes an air conditioning system,



powered steering, protection against 7.62mm ball attack, floodlights, flashing beacons, hand held spotlight, siren, public address system, fire extinguishers and drinking water tank. All windows are covered by wire mesh screens and a barricade removal device is provided at the front of the hull.

#### VARIANTS

There are no variants of the RG-12. Reumech OMC, has manufactured a similar vehicle called the RCV 9. This carries 9 men, including the driver and has a combat weight of 6,900kg. This has been built in production quantities and sold to Colombia as well as within South Africa. It is no longer being marketed.

#### STATUS

Production. In service in South Africa.

#### MANUFACTURER

Reumech OMC, Benoni, South Africa.



**RG-12 APC**

# SANTA BARBARA BLR APC (Spain)

## KEY RECOGNITION FEATURES

- Box-type hull with sloping nose, flat roof, vertical hull rear, vertical hull sides with top sloping slightly inwards

- Two large road wheels each side with forward-opening door between, two doors rear, one each side of central engine compartment which has louvres in roof and hull rear

- Depending on model, has various types of observation/firing device in hull sides, normally has cupola or turret on forward part of hull top to rear of commander's and driver's position

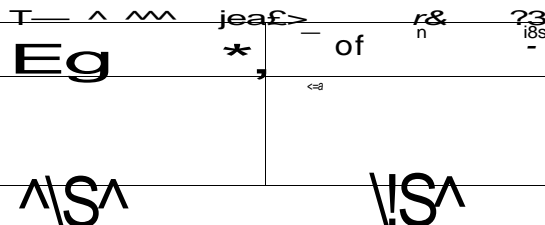
## SPECIFICATIONS

|                        |                |
|------------------------|----------------|
| Crew:                  | 1+12           |
| Configuration:         | 4x4            |
| Armament:              | 1 x 7.62mm MG  |
| Ammunition:            | 1,000 x 7.62mm |
| Length:                | 5.65m          |
| Width:                 | 2.5m           |
| Height:                | 2m (hull top)  |
| Ground clearance:      | 0.32m          |
| Wheelbase:             | 3.15m          |
| Weight, combat:        | 12,000kg       |
| Weight, unloaded:      | 9,600kg        |
| Power-to-weight ratio: | 17.5hp/tonne   |

Engine: Pegaso 6-cylinder turbo-charged in-line diesel developing 210hp at 2,100rpm

|                         |                         |
|-------------------------|-------------------------|
| Maximum road speed:     | 93km/hr                 |
| Maximum range:          | 570km                   |
| Fuel capacity:          | 200 lit                 |
| Fording:                | 1.1m                    |
| Vertical obstacle:      | Not available           |
| Trench:                 | Not applicable          |
| Gradient:               | 60%                     |
| Side slope:             | 30%                     |
| Armour:                 | 8mm (maximum)(estimate) |
| Armour type:            | Steel                   |
| NBC system:             | None                    |
| Night vision equipment: | None                    |

*BLR without armament*



## DEVELOPMENT

BLR (Blindado Liger de Ruedas), also known previously as Pegaso BLR 3545, has been designed mainly for use in internal security. Its hull gives the crew complete protection from small arms fire and shell splinters, commander and driver sit front and whole of rear is occupied by troop compartment with exception of engine compartment which is centre of hull at rear. To reduce procurement and life cycle costs, standard commercial components are used in the vehicle wherever possible.

Armament depends on role, but typically is one-man cupola with externally mounted 7.62mm MG. Standard equipment includes ventilation system, choice of manual or automatic transmission, fire suppression system for both engine compartment and wheels, bullet-proof tyres and 4,500kg capacity winch.

Wide range of optional equipment includes smoke/CS gas dischargers, PTO, specialised riot control equipment and various communications systems.

#### **VARIANTS**

Manufacturer has suggested alternative weapon systems including 12.7mm MG, 20mm or 25mm cannon and turret-mounted 90mm gun. More specialised versions could include ambulance and command.

#### **STATUS**

Production as required. In service with Ecuador, Spanish Marines and Guardia Civil.

#### **MANUFACTURER**

SANTA BARBARA, Madrid, Spain.



*Right: BLR with  
7.62mm MG*

# MOWAG Eagle Armoured Recon Vehicle (Switzerland)

## KEY RECOGNITION FEATURES

- Vertical hull front with radiator grille in centre, horizontal bonnet leading up to windscreen with two large windows that slopes slightly to the rear. Horizontal roof with turret in centre, hull slopes sharply down with lower part vertical
- Lower part of hull sides vertical with upper part sloping slightly inwards. Two doors in each side with windows in upper part
- Two large road wheels either side

## SPECIFICATIONS

|                         |                                                                    |
|-------------------------|--------------------------------------------------------------------|
| Crew:                   | 4                                                                  |
| Configuration:          | 4 x 4                                                              |
| Armament:               | 1 x 7.62 mm MG, 1 x 6 smoke grenadelaunchers                       |
| Ammunition:             | 400 x 7.62 mm                                                      |
| Length:                 | 4.90 m                                                             |
| Width:                  | 2.28 m                                                             |
| Height:                 | 1.75 m (hull top)                                                  |
| Ground clearance:       | 0.4 m                                                              |
| Wheelbase:              | 3.30m                                                              |
| Weight, combat:         | 5,100 kg                                                           |
| Weight, empty:          | 3,900 kJ                                                           |
| Power-to-weight ratio:  | 31.3 hp/t                                                          |
| Engine:                 | General Motors Type 6.5 1 NAV-8 diesel developing 160hp at 1700rpm |
| Maximum road speed:     | 125 km/h                                                           |
| Maximum road range:     | 450 km                                                             |
| Fuel capacity:          | 95!                                                                |
| Fording:                | 0.76m                                                              |
| Vertical obstacle:      | n/avail                                                            |
| Trench:                 | n/app                                                              |
| Gradient:               | 60%                                                                |
| Side slope:             | 40°/o                                                              |
| Armour:                 | classified                                                         |
| Armour type:            | steel                                                              |
| NBC:                    | yes                                                                |
| Night vision equipment: | none (optional)                                                    |

## DEVELOPMENT

The Eagle Armoured Reconnaissance Vehicle was developed by MOWAG to meet the requirements of the Swiss Army and

following trials with three prototype vehicles a production order was placed for 156 units with the first of these being delivered early in 1995.

The Eagle essentially consists of the chassis of the US AM General High Mobility Multi-purpose Wheeled Vehicle (HMMVW), of which over 140 000 have been built for the US Army and for export, fitted with a armoured body that provides the occupants with protection from small arms fire and shell splinters.

The engine is at the front, driver and commander in the centre and another two people to the rear. Mounted on the hull top is a one man turret with a 7.62 mm machine gun mounted on the right side. Turret traverse is through 360 degrees with weapon elevation from -10 to +20 degrees. A day/night thermal imaging device is fitted on the forward part of the turret. The bullet proof windows provide the same level of protection as the hull.

Standard equipment includes a NBC system, power steering and run-flat tyres. A wide range of optional equipment can be fitted including central tyre pressure system, heater and a winch.

## VARIANTS

First production vehicles are now known as Eagle Mk1 with the current model being Eagler MkII which has full depth bullet proof side windows, Artillery observation vehicle is being tested.

## STATUS

Production. In service with Denmark and Switzerland.

## MANUFACTURER

MOWAG Motorwagenfabrik, Kreuzlingen, Switzerland.



Above:  
MOWAG  
Eagle MK II

Top right:  
MOWAG  
Eagle MK II

Right:  
MOWAG  
Eagle MK II

Far right:  
MOWAG  
Eagle MK II



# MOWAG Piranha APC (Switzerland)

## KEY RECOGNITION FEATURES

- Pointed hull front with lower part sloping back to first road wheel station and upper part sloping up to horizontal hull top that extends to rear. Trim vane normally folded up under nose.

- Driver sits front left with engine compartment to right, troop compartment extends right to rear with troops entering via two doors in rear. Hull sides slope inward top and bottom just above road wheels

- MOWAG Piranha produced in 4x4, 6x6 and 8x8 versions but all have similar layout. In 6x6 rear two road wheels are close together, in 8x8 road wheels are equally spaced

## SPECIFICATIONS

| Model:                   | 4x4                      | 6x6       | 8x8       |
|--------------------------|--------------------------|-----------|-----------|
| Crew: (max)              | 10                       | 14        | 15        |
| Length:                  | 5.32m                    | 5.97m     | 6.365m    |
| Width:                   | 2.5m                     | 2.5m      | 2.5m      |
| Height (hull top):       | 1.85m                    | 1.85m     | 1.85m     |
| Weight, combat:          | 7,800kg                  | 10,500kg  | 12,300kg  |
| Weight, empty:           | 6,700kg                  | 8,000kg   | 8,800kg   |
| Power-to-weight ratio:   | 25hp/t                   | 28.6hp/t  | 24.4hp/t  |
| Engine type:(all diesel) | 6BTA 5.9                 | 6V-53T    | 6V-53T    |
| hp/rpm:                  | 195/2800                 | 300/2800  | 300/2800  |
| Maximum road speed:      | 100km/hr                 | 100km/hr  | 100km/hr  |
| Maximum water speed:     | 9.5km/hr                 | 10.5km/hr | 10.5km/hr |
| Maximum road range:      | 700km                    | 600km     | 780km     |
| Fuel capacity: (lit)     | 200                      | 200       | 300       |
| Fording:                 | All fully amphibious     |           |           |
| Vertical obstacle:       | 0.5m                     | 0.5m      | 0.5m      |
| Gradient:                | 70%                      | 70%       | 70%       |
| Side slope:              | 35%                      | 35%       | 35%       |
| Armour (maximum):        | 10mm                     | 10mm      | 10mm      |
| NBC system:              | Standard on all vehicles |           |           |
| Night vision equipment:  | Optional on all vehicles |           |           |

## DEVELOPMENT

In the early 1970s MOWAG started development of a range of 4x4, 6x6 and 8x8 armoured vehicles which have many common components and a wide range of roles. The family was subsequently called Piranha, first prototype completed in 1972 and first production vehicles in 1976.

In addition to being manufactured by MOWAG in Switzerland the Piranha family is also manufactured under licence in Canada (Diesel Division, General Motors of Canada),

Chile (FAMAE), and the UK (Alvis Vehicles). In the latter case they are all for export (Kuwait, Oman and Saudi Arabia).

There are separate entries for the Canadian (6x6), Canadian (8x8) LAV-25 and Bison (8x8) APCs.

All Piranhas have similar layout with driver front left, Detroit Diesel right, rear taken by troop compartment which has roof hatches and twin doors in rear. Troop compartment can have firing ports and vision devices and a wide range of weapon systems can be installed on roof.

Piranha is fully amphibious, propelled by two propellers under hull at rear. Before entering water a trim vane is erected at front and bilge pumps switched on.

Vehicle can be used for wide range of roles including ambulance, anti-tank armed with ATGWs, cargo, command, internal security, mortar carrier, recovery, reconnaissance and radar carrier.

Standard equipment includes NBC and air-conditioning system, optional equipment includes winch and night vision equipment.

## VARIANTS

4x4 can have various weapon stations up to turret-mounted 20mm cannon.

6x6 can have various turrets up to two-man turret armed with 90mm gun. Swiss Army has ordered 310 in anti-tank role with Norwegian Kvaerner-Eureka turret and twin TOW ATGW in ready-to-launch position.

8x8 version can have wide range of turrets and weapon systems including Euromissile Mephisto launcher with four HOT ATGWs, 90mm turret, 105mm turret with low recoil force gun, and multiple rocket launchers.

In 1994 the prototype of a MOWAG 10x10 Piranha was built



*Right: MOWAG  
Piranha (8x8) APC of  
the Swiss Army*

*Left: MOWAG Piranha  
(8x8) Generation III  
with 25mm turret*

*Below: MOWAG  
Piranha (6x6) fitted  
with 12.7 mm MG*



and fitted with a 105mm gun. In 1996 the MOWAG Piranha Generation III of 6x6, 8x8 and 10x10 vehicles was launched with increased armour and mobility.

#### **STATUS**

In production. Australia (8x8), Canada (6x6 and 8x8), Chile (6x6), Denmark (8x8), Ghana (4x4, 6x6 and 8x8), Liberia (4x4), Nigeria (6x6 and 8x8), Oman (8x8), Qatar (8x8), Saudi Arabia (8x8), Sierra Leone, Sweden (10x10), Switzerland (6x6 and 8x8), and USA (8x8). Unconfirmed reports indicate Taiwan ordered 50 MOWAG Piranhas (6x6) in 1984.

#### **MANUFACTURER**

MOWAG Motorwagenfabrik AG, Kreuzlingen, Switzerland (but see text).





# MOWAG Roland APC (Switzerland)

## KEY RECOGNITION FEATURES

- Nose slopes back under vehicle, well sloped glacis plate with driver's hatch in upper part, flat roof with engine compartment in left side, vertical rear with louvres in left side and door in right side
- Hull side welded in middle with upper and lower parts sloping inwards. Some vehicles have air louvres over left rear wheel
- Two wheels each side, sides of wheel arches outside armour envelope, door mid-way between wheel arches is hinged at top

## SPECIFICATIONS

|                                |                                                                         |
|--------------------------------|-------------------------------------------------------------------------|
| Crew:                          | 3+3                                                                     |
| <u>Configuration:</u>          | 4x4                                                                     |
| Armament:                      | 1 x 7.62mm MG                                                           |
| Ammunition:                    | 1,000 x 7.62mm                                                          |
| <u>Length:</u>                 | 4.44m                                                                   |
| <u>Width:</u>                  | 2.01m                                                                   |
| <u>Height turret top:</u>      | 2.03m                                                                   |
| Ground clearance:              | 0.4m                                                                    |
| Wheelbase:                     | 2.5m                                                                    |
| <u>Weight, combat:</u>         | <u>4.700kg</u>                                                          |
| <u>Weight, empty:</u>          | <u>3.900kg</u>                                                          |
| <u>Power-to-weight ratio:</u>  | <u>42.9hp/tonne</u>                                                     |
| Engine:                        | V-8 4-stroke water-cooled petrol<br><u>developing 202hp at 3,900rpm</u> |
| <u>Maximum road speed:</u>     | <u>110km/hr</u>                                                         |
| Maximum road range:            |                                                                         |
| <u>Fuel capacity:</u>          | 154 lit                                                                 |
| <u>Fording:</u>                |                                                                         |
| Vertical obstacle:             | 0.4m                                                                    |
| Trench:                        | <u>Not applicable</u>                                                   |
| Gradient:                      | 60%                                                                     |
| <u>Side slope:</u>             | 30%                                                                     |
| Armour:                        | <u>8mm (maximum) (estimate)</u>                                         |
| <u>Armour type:</u>            | Steel                                                                   |
| <u>NBC system:</u>             | None                                                                    |
| <u>Night vision equipment:</u> | <u>Optional</u>                                                         |

## DEVELOPMENT

Roland was designed by MOWAG in the early 1960s as a private venture for a wide range of roles including internal security, armoured personnel carrier and reconnaissance vehicle. First



prototypes completed in 1963, first production vehicles in 1964. Driver sits front left with crew compartment to rear. Each side of hull has entry hatch with firing port and observation hatch. Additional door in right rear side, engine compartment left rear.

Roland normally has three-man crew consisting of commander, machine gunner and driver and carries three fully equipped troops. A 7.62mm or 12.7mm MG can be mounted on top of hull on simple pintle mount, or turret armed with similar weapon can be installed.

Standard model has manual transmission with four forward and one reverse gears, but was also available with fully automatic transmission with three forward and one reverse gears.

Wide range of optional equipment was available including smoke grenade dischargers, night vision equipment, MOWAG-designed firing ports allowing some occupants to aim and fire from inside, obstacle-clearing blade at full front, searchlights and MOWAG bullet-proof cross-country wheels consisting of metal discs each side of tyre to support tyre when punctured

and give additional traction when moving across country.

Late production vehicles had a fully automatic transmission in place of the manual transmission and a slightly longer wheelbase. This model has a combat weight of 4,900kg and power-to-weight ratio of 41hp/tonne.

#### **VARIANTS**

No variants except for different armament installations.

#### **STATUS**

Production complete. In service with many countries including Argentina, Bolivia, Chile, Greece and Peru.

#### **MANUFACTURER**

MOWAG Motorwagenfabrik AG, Kreuzlingen, Switzerland.

*Right: MOWAG Roland with remote-controlled 7.62mm machine gun*



# Otokar Cobra (ARC)

## KEY RECOGNITION FEATURES

- Vertical hull front which slopes back under nose of vehicle, bonnet slopes up to two part windscreen which is angled to the rear, horizontal roof in the centre of which is mounted the weapon station, to the rear of this are two roof hatches
- Pointed hull rear with large door that opens to left with integral vision block and firing port below
- Upper part of hull slopes inwards with wheels almost at extreme ends of vehicle. In each side of the hull is a side windscreen behind which is a forward opening door and to the rear of this are vision blocks with firing ports below

## SPECIFICATIONS

|                         |                                                                   |
|-------------------------|-------------------------------------------------------------------|
| Crew:                   | 2+11                                                              |
| Armament:               | 1 x 12.7 mm MG (typical)                                          |
| Ammunition:             | 1000x12.7 mm                                                      |
| Length:                 | 5.316m                                                            |
| Width:                  | 2.156m                                                            |
| Height:                 | 1.9 m (without armament)                                          |
| Ground clearance:       | 0.365 m                                                           |
| Weight, combat:         | 6000 kcl                                                          |
| Weight, empty:          | 4800 kg                                                           |
| Power-to-weight ratio:  | 31 hp/t                                                           |
| Ground pressure:        | n/available                                                       |
| Engine:                 | General Motors V8 turbocharged diesel developing 190hp at 3400rpm |
| Maximum road speed:     | 110 km/h                                                          |
| Maximum road range:     | 550 km                                                            |
| Fuel capacity:          | 145 litres                                                        |
| Fording:                | 1 m                                                               |
| Vertical obstacle:      | 0.32 m                                                            |
| Trench:                 | n/available                                                       |
| Gradient:               | 70%                                                               |
| Side slope:             | 40%                                                               |
| Armour:                 | classified                                                        |
| Armour type:            | steel                                                             |
| NBC system:             | optional                                                          |
| Night vision equipment: | optional                                                          |

## DEVELOPMENT

The Cobra (4 x 4) armoured personnel carrier was developed by Otokar based on their extensive experience in the design, development and production of other 4x4 armoured cars and armoured personnel carriers which use a Land Rover chassis.

The Cobra has an integral all welded steel armoured hull and automotive components from the US AM General High Mobility Multi Purpose Wheeled Vehicle (4 x 4) which is used in large numbers by the US Army and many other countries.

The powerpack is at the front of the Cobra with the commander and driver being seated in the centre and the troop compartment extending to the rear, entry to this is normally via a large door in the rear although there is a door in either side.

A wide range of weapon stations can be mounted on the roof such as remote controlled 7.62 mm and 12.7 mm machine guns or a one person turret armed with similar weapons with electrically operated smoke grenade launchers either side.

Optional equipment on the Cobra includes a central tyre pressure inflation system, electric winch, NBC system, various day and night periscopes and specialised communications equipment.

An amphibious version of the Cobra has been developed to the prototype stage this being propelled in the water by two water jets mounted one either side at the hull rear.

## VARIANTS

In addition to the basic ARC other variants have been projected including reconnaissance vehicle, command and control vehicle, ambulance and TOW missile carrier.

## STATUS

Production. In service with Turkey.

## MANUFACTURER

Otokar Otobus Karoseri Sanayi AS, Adapazari, Turkey.



**Above:**  
Otokar Cobra APC  
without armament

**Right:**  
Otokar Cobra APC  
with external 12.7  
mm MG

**Top right:**  
Otokar Cobra APC  
with turret mounted  
MG

**Far right:**  
Otokar Cobra APC  
without armament



# Otakar APC (Turkey)

## KEY RECOGNITION FEATURES

- Conventional layout, with armour-plated engine compartment front with horizontal louvers in centre, bonnet slopes slightly upwards to windscreen which slopes to rear
- Front of roof has sloping front with searchlight on top, hull top horizontal and rear hull vertical. Machinegun mount on roof with spare wheel to rear. Forward-opening door in each side has bullet-proof window in upper part. Three small firing ports with window above in either side of troop compartment.
- Two wheels each side with extended wheel arches above. Lower hull sides are vertical, upper part slopes slightly inwards.

## SPECIFICATIONS

|                         |                                                                                                                                          |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Crew:                   | 2 + 6                                                                                                                                    |
| Configuration:          | 4 x 4                                                                                                                                    |
| Armament:               | 1 x 7.62mm MG, 1 x 6 smoke grenade launchers                                                                                             |
| Ammunition:             | 1000 x 7.62mm                                                                                                                            |
| Length:                 | 4.155m                                                                                                                                   |
| Width:                  | 1.81m                                                                                                                                    |
| Height:                 | 2.26m (hull top) 2.75m with MG                                                                                                           |
| Weight, combat:         | 3600kg                                                                                                                                   |
| Weight, empty:          | 3000kg                                                                                                                                   |
| Power-to-weight ratio:  | 37hp/t                                                                                                                                   |
| Engine:                 | Land Rover V-8 3.5 litre petrol developing 134hp at 5000rpm or Rover 300 Tdi 4-cylinder turbocharged diesel developing 111 hp at 4000rpm |
| Maximum road speed:     | 125km/hr                                                                                                                                 |
| Maximum range:          | 500km                                                                                                                                    |
| Fuel capacity:          | 85l                                                                                                                                      |
| Fording:                | 0.6m                                                                                                                                     |
| Vertical obstacle:      | 0.315m                                                                                                                                   |
| Trench:                 | n/a                                                                                                                                      |
| Gradient:               | 70%                                                                                                                                      |
| Side slope:             | 400%                                                                                                                                     |
| Armour:                 | classified                                                                                                                               |
| Armour type:            | Steel                                                                                                                                    |
| NBC system:             | No                                                                                                                                       |
| Night vision equipment: | No                                                                                                                                       |

## DEVELOPMENT

The Otakar APC was developed for the Turkish army with first prototypes completed in 1993 and production vehicles in 1994. In many respects it is similar to the Shorland 555 (qv). It consists of a modified Land Rover Defender 4 x 4 chassis, fitted with a fully-armoured body that provides protection from small arms fire. The engine is at the front as in a normal Land Rover, with the commander and driver behind it, each provided with a forward-opening side door with window. The six troops are seated three to either side, facing each other. They enter and exit via door doors in the hull rear. Firing ports and vision devices are provided in the sides and rear of the troop compartment, and a 7.62mm machinegun mount is fitted on the forward part of the roof. The mount can be traversed through 360° and elevated from -12° to +65°.

## VARIANTS

None, although the vehicle can be adapted for a variety of roles. The similar Otakar Akrep (Scorpion) light reconnaissance vehicle, also based on the Land Rover Defender, has a crew of three and has a remotely-controlled 7.62mm machinegun on the roof.

## STATUS

In production. In service with Turkey and other undisclosed countries.

## MANUFACTURER

Otakar Otobus Karoseri Sanayi AS, Istanbul, Turkey

*Right: Otakar APC with 7.62mm MG*





# Shorland Armoured Patrol Car (UK/Australia)

## KEY RECOGNITION FEATURES

- Land Rover chassis with armoured engine compartment front, crew compartment centre, commander and driver each have forward-opening side door with drop-down vision port in upper part and windscreen to front, which can be covered by two armoured shutters hinged at top

- One-man six-sided turret on hull roof, turret rear in line with rear of crew compartment which then drops down to back of vehicle which is almost in line with engine compartment

- Two large road wheels each side that extend from hull side, extended wheel arches above

## SPECIFICATIONS

Crew:

Configuration:

•1x1

Armament:

1 x 7.62mm MG

Ammunition:

1600 x 7.62mm

Length:

4.49m

Width:

1.8m

Height:

1.8m (roof)

Ground clearance:

0.324m

Wheelbase:

2.79m

Weight, combat:

3,600kg

Power-to-weight ratio:

37.8bhp/tonne

Engine:

Rover 4-stroke V-8 petrol developing  
134bhp at 5000rpm (or diesel engine)

Maximum road speed:

120km/hr

Maximum road range:

630km

Fuel capacity:

136 lit

Fording:

0.5m

Vertical obstacle:

0.23m

Trench:

Not applicable

Gradient:

60%

Side slope:

Armour:

8mm

Armour type:

Steel

NBC system:

None

Night vision equipment:

None

(Above relates to current production 552 vehicle)

## DEVELOPMENT

Shorland was originally developed in 1965 to meet the requirements of Royal Ulster Constabulary for Northern Ireland. First production vehicles were completed in 1965 since when



well over 1,000 have been built, mostly for export. The original vehicles have now been taken over by the British Army.

Shorland is a modified long wheelbase Land Rover chassis with a fully armoured body for protection from small arms fire and shell splinters.

First production vehicles were Mk 1s, followed by the Mk 2, 3, 4 and 5, the main difference being the Land Rover chassis used. Mk 5 has improved coil suspension and wider wheel track. Current production models are known as the Series 5 with the Armoured Patrol Car being designated the S52.

The 7.62mm MG mounted in turret has manual traverse and elevation and four electrically operated smoke grenade dischargers can be mounted each side, firing forwards. Optional equipment includes various radios, air-conditioning system and loud hailer. Different vision arrangements are also available as is a version powered by a 107bhp diesel engine. Latest production vehicles have a redesigned rear angled 45 degrees and a slightly different hull front.



*aLeft:  
Shorland  
S52*



*Right:  
Shorland  
S52*

The Shorland was originally manufactured by Shorts in Northern Ireland but all future production will be undertaken by Tenix Defence Systems in Australia

#### **VARIANTS**

552 is the basic Shorland armoured patrol car.

553 is mobile air defence vehicle. Mounted on the turret roof is a lightweight mounting with three Javelin SAMs in the ready-to-launch position.

554 is an anti-hijack vehicle with a special turret fitted with a mounting for a sniper's rifle.

555 is the ARC and covered in the ARC section.

#### **STATUS**

In production. In service with 40 countries including Argentina, Bahrain, Botswana, Brunei, Burundi, Cyprus, Guyana, Kenya, Lesotho, Libya, Malaysia, Mali, Portugal, Syria, Thailand, United Arab Emirates and UK (Northern Ireland only).

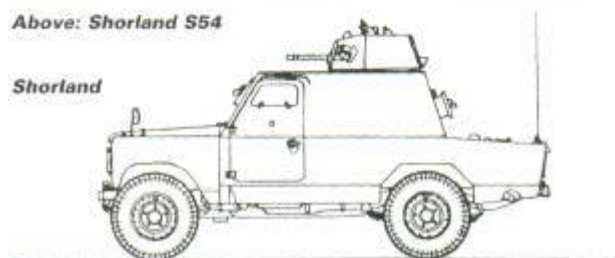
#### **MANUFACTURER**

Tenix Defence Systems, Australia.



*Above: Shorland S54*

*Shorland*



# Daimler Ferret Scout Cars (UK)

## KEY RECOGNITION FEATURES

- Driver front, turret centre, engine compartment rear with roof that slopes down slightly each side with louvres at far rear top. Top half of hull rear vertical, lower half slopes back under hull rear
- Well sloped glacis plate, driver has hatch hinged at top that opens upwards and similar smaller hatch each side. Upper part of hull front, sides and rear slope inwards
- Two large road wheels each side with spare wheel and tyre on left side of hull

## SPECIFICATIONS Mk 2/3

|                           |                                                                                            |
|---------------------------|--------------------------------------------------------------------------------------------|
| Crew:                     | 2                                                                                          |
| Armament:                 | 1 x 7.62mm MG, 2 x 3 smoke grenade dischargers                                             |
| Ammunition:               | 1,000x 7.62mm                                                                              |
| Length:                   | 3.835m                                                                                     |
| Width:                    | 1.905m                                                                                     |
| Height:                   | 1.879m                                                                                     |
| Ground clearance:         | 0.33m                                                                                      |
| Wheelbase:                | 2.286m                                                                                     |
| Weight, combat:           | 4,400kg                                                                                    |
| Weight, empty:            | 3,640kg                                                                                    |
| Power-to-weight ratio:    | 29.35bhp/tonne                                                                             |
| Engine:                   | Rolls-Royce B60 Mk 6A 6-cylinder in-line water-cooled petrol developing 129bhp at 3,750rpm |
| Maximum road speed:       | 93km/hr                                                                                    |
| Maximum road range:       | 306km                                                                                      |
| Fuel capacity:            | 96 lit                                                                                     |
| Fording:                  | 0.914m                                                                                     |
| Fording with preparation: | 1.524m                                                                                     |
| Vertical obstacle:        | 0.406m                                                                                     |
| Trench with channels:     | 1.22m                                                                                      |
| Gradient:                 | 46%                                                                                        |
| Side slope:               | 30%                                                                                        |
| Armour:                   | 8-16mm                                                                                     |
| Armour type:              | Steel                                                                                      |
| NBC system:               | None                                                                                       |
| Night vision equipment:   | None                                                                                       |

## DEVELOPMENT

Ferret series 4x4 scout car was developed by the Daimler company

shortly after the Second World War for the British Army. First prototypes completed in 1949 with production running from 1952 to 1971. Total production amounted to 4,409 vehicles for home and export. It is no longer used by the British Army.

Ferret Mk 2/3 has driver at front, commander centre and engine rear. Turret has manual traverse through 360°, 7.62mm machine gun with manual elevation from -15° to +45°. Turret is identical to that on many Alvis Saracen (6x6) APCs. Spare wheel carried on left side of hull, emergency hatch on opposite side. Channels were often carried across front of hull for crossing ditches or sandy terrain.

## VARIANTS

Ferret Mk 1 has no turret and open top, normally has pintle-mounted 7.62mm MG.

Mk 1/2 has crew of three and low profile turret with 7.62mm machine gun.

Mk 2 is similar to Mk 2/3, with turret.

Mk 2/2 was for Far East, no longer in service.

Mk 2/4 has additional armour.

Mk 2/5 is Mk 2 brought up to Mk 2/4 standard.

Mk 2/6 is Mk 2/3 with Vigilant ATGW mounted each side of turret. No longer used by British Army but may be found in Middle East.

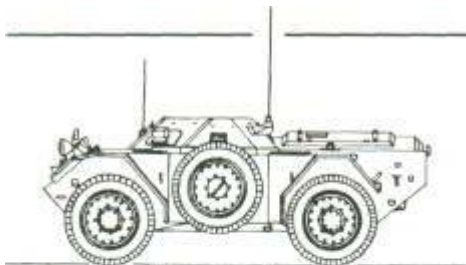
Mk 2/7 is Mk 2/6 with missiles removed and equals Mk 2/3.

Mk 3 is Mk 1 with same modifications as Mk 4.

Mk 4 is Mk 2/3 rebuilt with many improvements including larger wheels and flotation screen.

Mk 5 had Swingfire ATGWs. No longer in service.

Further development of Mk 4 (or 'big wheeled Ferret') resulted in Fox (qv). A number of companies, including Alvis Vehicles (now design authority for the Ferret) offer upgrade packages



*Left: Daimler  
Ferret Mk 1*



*Right: Ferret  
Mk 1*



*Left: Daimler  
Ferret Mk 4*



*Right: Daimler  
Ferret Mk 2/3*

for the Ferret including a more fuel-efficient diesel engine. Alvis has already sold its repower package to Malaysia.

### **STATUS**

Production complete. In service with Bahrain, Burkina Faso, Cameroon, Central African Republic, India, Indonesia, Jordan, Kenya, Lebanon, Madagascar, Malawi, Malaysia, Nepal, South Africa, Sri Lanka and Sudan.

### **MANUFACTURER**

Daimler Limited, Coventry, England, UK.

# Fox Light Armoured Car (UK)

## KEY RECOGNITION FEATURES

- Two large road wheels each side with stowage box between, flotation screen carried on hull top
- Well sloped glacis plate with large driver's hatch opening to right in upper part
- Turret in hull centre with two hatch covers opening to rear, long 30mm RARDEN cannon with day/night sight on right, turret welded in middle and upper and lower parts sloping inwards

## SPECIFICATIONS

|                         |                                                                           |
|-------------------------|---------------------------------------------------------------------------|
| Crew:                   | 3                                                                         |
| Configuration:          | 4x4                                                                       |
| Armament:               | 1 x 30mm cannon, 1 x 7.62mm MG (coaxial), 2 x 4 smoke grenade dischargers |
| Ammunition:             | 99 x 30mm, 2,600 x 7.62mm                                                 |
| Length gun forwards:    | 5.08m                                                                     |
| Length hull:            | 4.166m                                                                    |
| Width:                  | 2.134m                                                                    |
| Height overall:         | 2.2m                                                                      |
| Height to turret top:   | 1.981m                                                                    |
| Ground clearance:       | 0.3m                                                                      |
| Wheelbase:              | 2.464m                                                                    |
| Weight, combat:         | 6120kg                                                                    |
| Weight, empty:          | 5733kg                                                                    |
| Power-to-weight ratio:  | 30.04bhp/tonne                                                            |
| Engine:                 | Jaguar XK 4.2 litre 6-cylinder petrol developing 190bhp at 4,500rpm       |
| Maximum road speed:     | 104km/hr                                                                  |
| Maximum water speed:    | 5.23km/hr                                                                 |
| Maximum road range:     | 434km                                                                     |
| Fuel capacity:          | 145 lit                                                                   |
| Fording:                | 1m, amphibious with preparation                                           |
| Vertical obstacle:      | 0.5m                                                                      |
| Trench with channels:   | 1.22m                                                                     |
| Gradient:               | 46%                                                                       |
| Side slope:             | 30%                                                                       |
| Armour:                 | Classified                                                                |
| Armour type:            | Aluminium                                                                 |
| NBC system:             | None                                                                      |
| Night vision equipment: | Yes (passive for driver and gunner)                                       |

## DEVELOPMENT

Combat Vehicle Reconnaissance (Wheeled) was developed in the 1960s by the then Fighting Vehicles Research and Development Establishment (FVRDE) at the same time as the Combat Vehicle Reconnaissance (Tracked) Scorpion. The prototypes were built by Daimler, Coventry, the first completed in 1967. Production was undertaken by the then Royal Ordnance Factory, Leeds, first production vehicles completed in 1973. In 1986 Royal Ordnance Leeds was taken over by Vickers Defence Systems. The production line for Fox was however closed some time ago.

Driver sits front, two-man turret centre, engine and transmission rear. Turret has manual traverse through 360° and 30mm RARDEN cannon elevates from -14° to +40°. Ammunition consists of APDS-T, APSE-T, HEI-T and training.

The Fox light armoured car is fitted with a flotation screen and when this is erected the vehicle is propelled and steered in the water by its wheels. These were removed from British Army vehicles.

## VARIANTS

Many variants of the Fox were projected but none of these entered service. The Fox has been phased out of service with the British Army and their turrets have been fitted onto the Scorpion chassis to produce the Sabre reconnaissance vehicle. Some 30mm Fox Turrets were fitted onto British Army FV432 series APC's.

## STATUS

Production complete. In service with Malawi and Nigeria.

## MANUFACTURER

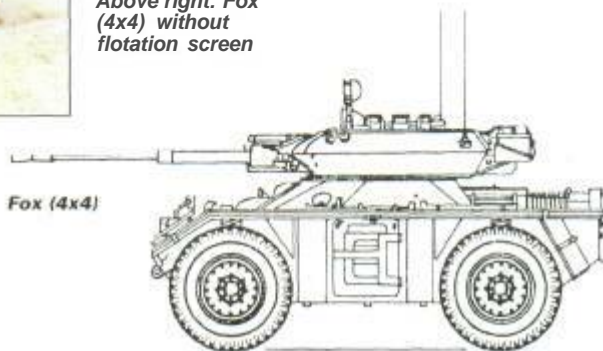
Vickers Defence Systems, Leeds, England, UK.



*Above right: Fox (4x4)  
without flotation  
screen*



*Above right: Fox  
(4x4) without  
flotation screen*



*Fox (4x4)*

# Alvis Vehicles Saxon APC (UK)

## KEY RECOGNITION FEATURES

- Box-shaped hull with front sloping to rear and driver's position offset to right, horizontal louvres on front and left side of hull, single door in right side of hull and twin doors rear
- Flat roof with commander's fixed cupola on forward part with rear-opening hatch, vision block in each side and 7.62mm MG on external DISA mount
- Two large road wheels each side with stowage bins on left side of hull and wire stowage box on roof

(Note: left-hand drive model available; export vehicles have door in left side of hull)

## SPECIFICATIONS

|                         |                                                             |
|-------------------------|-------------------------------------------------------------|
| Crew:                   | 2+8 (or 10)                                                 |
| Configuration:          | 4x4                                                         |
| Armament:               | 1 x 7.62mm MG                                               |
| Ammunition:             | 1,000 x 7.62mm                                              |
| Length:                 | 5.169m                                                      |
| Width:                  | 2.489m                                                      |
| Height:                 | 2.628m (commander's cupola)                                 |
| Ground clearance:       | 0.41m (hull), 0.29m (axles)                                 |
| Wheelbase:              | 3.073m                                                      |
| Weight, combat:         | 11,660kg                                                    |
| Weight, empty:          | 9,940kg                                                     |
| Power-to-weight ratio:  | 14.06bhp/tonne                                              |
| Engine:                 | Bedford 500 6-cylinder diesel developing 164bhp at 2,800rpm |
| Maximum road speed:     | 96km/hr                                                     |
| Maximum road range:     | 480km                                                       |
| Fuel capacity:          | 153 lit                                                     |
| Fording:                | 1.12m                                                       |
| Vertical obstacle:      | 0.41m                                                       |
| Trench:                 | Not applicable                                              |
| Gradient:               | 60%                                                         |
| Side slope:             | 30%                                                         |
| Armour:                 | Classified                                                  |
| Armour type:            | Steel                                                       |
| NBC system:             | None                                                        |
| Night vision equipment: | None                                                        |

## DEVELOPMENT

Saxon (4x4) was developed as a private venture by GK Defence, (which late in 1998 merged with Alvis Vehicles) first prototype completed in 1976 and first production vehicles in 1976. In 1983

it was adopted by the British Army for infantry battalions based in UK but deployed to Germany in wartime.

Driver sits front left or front right, engine in lower part of hull and troop compartment extending right to rear. Troops on bench seats down both sides and enter via side doors or two doors at rear. Commander has fixed cupola or turret with single or 7.62mm twin MGs.

Optional equipment includes air-conditioning system, front-mounted winch, heater, grenade launchers, barricade remover, searchlights, front-mounted winch and replacement of Bedford engine by Perkins T6.3544 diesel developing 195hp at 2,500rpm.

Latest production vehicles for the British Army are powered by a Cummins 6BT 5.91 litre turbocharged 6-cylinder diesel engine developing 160hp coupled to a fully automatic transmission.

By late 1995 total production of the Saxon APC amounted to almost 800 vehicles with the British Army being largest customer. Late production models for British Army are called Saxon Patrol and were for Northern Ireland. Some British Army Saxon APCs have one-man 7.62mm machine gun turret fitted.

## VARIANTS

Command vehicle - fitted with additional communications equipment.

Ambulance - In service with British Army.

Recovery - in service with British Army, has winch with capacity of 16 tonnes.

Incident control vehicle - prototype only for IS applications.  
Water cannon - prototype only.

## STATUS

Production complete. In service with Bahrain, Hong Kong, Malaysia, Nigeria, Oman, United Arab Emirates and UK.

*GKN Saxon (4x4) with  
MG turret*



**MANUFACTURER**

Alvis Vehicles Limited,  
Shropshire, England, UK.

*Top right:  
Saxon command post  
(Richard Stickland)*

*Far right:  
Saxon with MG turret  
(Christopher f Foss)*

*Right:  
Saxon Patrol  
(Richard Stickland)*





# Shorland S 55 APC (UK/Australia)

## KEY RECOGNITION FEATURES

- Conventional layout with armour plated engine compartment front, angled windscreen with armoured louvres hinged at top, hull top above commander. Driver has integral spotlight, horizontal roof over rear troop compartment, vertical hull rear
- Single forward-opening door each side with outward-opening observation panel in upper part, two rectangular firing ports in hull sides that slope slightly inwards, two doors rear each with firing port
- Two road wheels each side with rounded front and square cut rear wheel arches (See variants)

## SPECIFICATIONS

|                         |                                                             |
|-------------------------|-------------------------------------------------------------|
| Crew:                   | 2+6                                                         |
| Configuration:          | 4x4                                                         |
| Armament:               | 2 x 4 smoke grenade dischargers                             |
| Length:                 | 4.25m                                                       |
| Width:                  | 1.8m                                                        |
| Height:                 | 2.28m                                                       |
| Ground clearance:       | 0.324m                                                      |
| Wheelbase:              | 2.795m                                                      |
| Weight, combat:         | 3,600kg                                                     |
| Power-to-weight ratio:  | 37.2hp/tonne                                                |
| Engine:                 | Rover V-8 water-cooled petrol developing 134bhp at 5,000rpm |
| Maximum road speed:     | 120km/hr                                                    |
| Maximum range:          | 630km                                                       |
| Fuel capacity:          | 136 lit                                                     |
| Fording:                | 0.50m                                                       |
| Vertical obstacle:      | 0.23m                                                       |
| Trench:                 | Not applicable                                              |
| Gradient:               | 60% (estimate)                                              |
| Side slope:             | 30% (estimate)                                              |
| Armour:                 | 8mm (estimate)                                              |
| Armour type:            | Steel                                                       |
| NBC system:             | None                                                        |
| Night vision equipment: | None                                                        |

## DEVELOPMENT

In the early 1970s Short Brothers developed an APC based on a Land Rover (4x4) chassis to work with its Shorland Armoured Patrol Vehicle on a similar chassis. First prototype completed in 1973 under the designation SB 301.

This was followed in production by SB 401 with improved armour protection and more powerful engine, and in 1980 SB 501 was introduced, based on new Land Rover One-Ten chassis with wider wheelbase and improved coil spring suspension. Depending on year of manufacture there are minor exterior differences between vehicles, especially hull front; for example, on early vehicles radiator grille was short distance back from front mudguards whereas on SB 501 it is slightly forward of radiator.

Layout of all versions virtually identical with engine front, commander and driver to its rear (left-hand and right-hand drive models available), and troop compartment rear, three men each side facing.

Wide range of optional equipment including long-range fuel tank, smoke grenade dischargers, flashing lamps, air-conditioning system and roof-mounted 7.62mm MG.

To date all production of the vehicle has been undertaken in Northern Ireland but sales and marketing is carried out by Tenix Defence Systems of Australia who own the rights of all the Shorland vehicles.

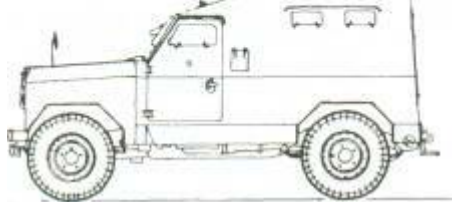
## VARIANTS

No variants but see also Shorland Armoured Patrol Vehicle (ACRVs). Current production models have different hull front, three small vision blocks with associated firing ports in either side of hull and integral bullet-proof windows for commander and driver.

## STATUS

In production. In service with more than 20 countries including Malaysia, Papua New Guinea Defence Force, Pakistan, and Turkey.

**Shorland SB  
501 (4x4) ARC**



**MANUFACTURER**

Tenix Defence Systems, Australia.

***Below: Latest  
production  
S55 (4x4)***



***Above:  
Shorland 555  
(4x4) APC  
with roof-  
mounted MG***

***Right:  
Shorland S55  
(4x4) APC on  
One-Ten  
chassis***



# Glover Webb Armoured Patrol Vehicle (UK)

## KEY RECOGNITION FEATURES

- Conventional layout with armour plated engine compartment front with wire mesh screen across front, bonnet horizontal to windscreen which can be provided with wire mesh screen that hinges forward onto bonnet when not required
- Front part of roof has slightly sloping front with searchlight above, hull top horizontal and hull rear vertical. Hatch in roof of British Army vehicles. Forward opening door in each side has bullet proof window in upper part. Troops enter and leave via twin doors in rear each of which has vision block
- Two wheels each side with arches above, lower part of hull sides are vertical with upper part sloping slightly inwards

## SPECIFICATIONS

|                         |                                    |
|-------------------------|------------------------------------|
| Crew:                   | 2 + 6                              |
| Configuration:          | 4 x 4                              |
| Armament:               | nil                                |
| Ammunition:             | nil                                |
| Length:                 | 4.55m                              |
| Width:                  | 1.79m                              |
| Height:                 | 2.08m                              |
| Ground clearance:       | 0.32m                              |
| Wheelbase:              | 2.794m                             |
| Weight, combat:         | Not available                      |
| Weight, empty:          | Not available                      |
| Power-to-weight ratio:  | Not available                      |
| Engine:                 | Rover V-8 petrol developing 114 hp |
| Maximum road speed:     | 120km/h                            |
| Maximum road range:     | Not available                      |
| Fuel capacity:          | Not available                      |
| Fording:                | Not available                      |
| Vertical obstacle:      | 0.23m                              |
| Trench:                 | Not applicable                     |
| Gradient:               | 60%                                |
| Side slope:             | 30%                                |
| Armour:                 | Classified                         |
| Armour type:            | Steel                              |
| NBC:                    | No                                 |
| Night vision equipment: | No                                 |

## DEVELOPMENT

The Glover Webb Armoured Patrol Vehicle (APV) was originally developed to meet the requirements of the British Army for use in Northern Ireland with the first of about 100 vehicles being completed in 1986. Glover Webb was taken over by GKN Defence who subsequently merged with Alvis Vehicles late in 1998.

The vehicle is essentially a Land Rover chassis fitted with an armoured body that provides the occupants with protection from small arms fire and shell splinters. The engine is at the front, commander and driver in the centre and the troop compartment at the rear. The troops are seated three down each side facing each other.

## VARIANTS

Can be provided with firing ports in rear troop compartment and roof mounted 7.62mm machine gun. Glover Webb have also built quantities of Hornet (4 x 4) armoured car based on a modified Land Rover chassis, this is fitted with a roof mounted turret armed with a 7.62mm machine gun.

Many other companies build light armoured vehicles based on the Land Rover (4 x 4) Defender chassis including NP Aerospace of the UK who have built over 1000 of the CAV 100 vehicles, many for the British Army.

## STATUS

Production as required. In service with British Army, Police and other undisclosed users.

## MANUFACTURER

Glover Webb, Telford, Shropshire, UK.



*Above: Glover Webb  
Armoured Patrol  
Vehicle*



*Above: Glover Webb  
Armoured Patrol  
Vehicle*

*Right: Glover Webb  
Hornet*



# Glover Webb Tactica APC (UK)

## KEY RECOGNITION FEATURES

- Conventional layout with armour plated engine compartment front with horizontal louvers in the centre, bonnet slopes slightly upwards to windscreen which slopes to rear
- Front part of roof has slightly sloping front with hull top horizontal and hull rear vertical, lower part of hull rear slopes inwards. Forward opening door in each side has bullet proof window in upper part. Three firing ports with bullet proof window above in either side of rear troop compartment
- Two wheels each side, lower part of hull sides slope slightly inwards, upper part of hull are vertical, twin door in hull rear with two firing ports with vision blocks above

## SPECIFICATIONS

|                         |                                                         |
|-------------------------|---------------------------------------------------------|
| Crew:                   | 2 + 12                                                  |
| Configuration:          | 4 x 4                                                   |
| Armament:               | Nil (see text)                                          |
| Ammunition:             | Nil (see text)                                          |
| Length:                 | 5.6m                                                    |
| Width:                  | 2.2m                                                    |
| Height:                 | 2.35m                                                   |
| Ground clearance:       | 0.3 m                                                   |
| Wheelbase:              | Not available                                           |
| Weight, combat:         | 10,000kg                                                |
| Weight, empty:          | 6,500l-g                                                |
| Power-to-weight ratio:  | See text                                                |
| Engine:                 | Mercedes, Perkins or Renault turbocharged diesel engine |
| Maximum road speed:     | 120km/h                                                 |
| Maximum road range:     | 650km                                                   |
| Fuel capacity:          | 167l                                                    |
| Fording:                | Not available                                           |
| Vertical obstacle:      | Not available                                           |
| Trench:                 | ~JT/app~                                                |
| Gradient:               | 60%                                                     |
| Side slope:             | 30%                                                     |
| Armour:                 | Classified                                              |
| Armour type:            | Steel                                                   |
| NBC:                    | No                                                      |
| Night vision equipment: | No                                                      |

## DEVELOPMENT

The Tactica APC (4 x 4) was developed as a private venture by Glover Webb who were taken over by GKN Defence who in turn merged with Alvis Vehicles in late 1998. First prototype of the Tactica was completed in 1988 with first production vehicles being completed the following year.

Two versions of the Tactica are currently offered, one with a forward control type hull which can carry up to 14 men and the other with a conventional bonnet type hull which can carry up to 10 men. Different wheelbase models are available as are different engines.

The conventional bonnet type has the engine at the front, commander and driver in the centre and the troop compartment at the rear. The troops normally enter and leave via two doors in the hull rear. The basic model is unarmed but can be fitted with a variety of roof mounted weapon stations including a pintle mounted 7.62mm or 12.7mm machine gun or one man turret armed with similar weapons.

Standard equipment includes power steering and a wide range of optional equipment is available according to mission requirements.

### Variants

The vehicle can be adopted for a wide range of roles, for example fitted with a water cannon and for use in command post role. The UK uses the vehicles to transport EOD teams.

## STATUS

Production. In service with Argentina (UN role), Indonesia, Kuwait, Mauritius, Singapore, UK and other countries.

## MANUFACTURER

Glover Webb, Telford, Shropshire, UK.



*Above: Tactica water  
cannon background  
with bonneted Tactica  
ib front*

*Top right: APC Tactica*

*Right: Two versions of  
Tactica*



# Alvis Vehicles Simba APC (UK)

## KEY RECOGNITION FEATURES

- Box-shaped hull sloping up to raised drivers position on left side, engine compartment on right side with louvres on lower part of glacis plate. Horizontal roof extends to rear, vehicle hull rear with large door
- Upper part of hull slopes inwards with two part door in left side of hull and single hatch in right side of hull. Various armament options can be mounted on roof
- Two large road wheels each side, lower part of hull slopes inwards

## SPECIFICATIONS

|                         |                                                                             |
|-------------------------|-----------------------------------------------------------------------------|
| Crew:                   | 3 + 8/10                                                                    |
| Configuration:          | 4 x 4                                                                       |
| Armament:               | 1 x 7.62mm MG                                                               |
| Ammunition:             | 1000 x 7.62mm                                                               |
| Length:                 | 5.35m                                                                       |
| Width:                  | 2.50m                                                                       |
| Height:                 | 2.19m (low profile cupola)                                                  |
| Ground clearance:       | 0.45m (hull), 0.33 m (axles)                                                |
| Wheelbase:              | 2.972m                                                                      |
| Weight, combat:         | 11,200kg                                                                    |
| Weight, empty:          | 9,500kg                                                                     |
| Power-to-weight ratio:  | 18.75 bhp/tonne                                                             |
| Engine:                 | Perkins 210Ti turbocharged intercooled diesel developing 210 bhp at 2500rpm |
| Maximum road speed:     | 100km/h                                                                     |
| Maximum road range:     | 660km                                                                       |
| Fuel capacity:          | 296l                                                                        |
| Fording:                | 1m                                                                          |
| Vertical obstacle:      | 0.45m                                                                       |
| Trench:                 | Not applicable                                                              |
| Gradient:               | 60%                                                                         |
| Side slope:             | 40%                                                                         |
| Armour:                 | 8 mm (maximum) (estimate)                                                   |
| Armour type:            | Steel                                                                       |
| NBC:                    | No (optional)                                                               |
| Night vision equipment: | No (optional)                                                               |

## DEVELOPMENT

The Simba light combat vehicle was designed as a private venture by GKN Defence (now Alvis Vehicles) specifically for the export market and following trials was selected by the Philippines Armed Forces who placed an order for 150 vehicles.

Of these 150 vehicles, eight vehicles were delivered complete, two in knocked down kit form and the remaining 138 were assembled in the Philippines at a facility owned by the joint venture company Asian Armoured Vehicle Technologies Corporation.

The driver is seated front left with the powerpack to his right and the troop compartment extending to the rear. The troops sit on seats down either side and can leave the vehicle via the door in the rear or the door in left side of the hull. Most vehicles used by the Philippines have a one man turret armed with a 12.7mm M2 machine gun.

A wide range of optional equipment can be fitted including front mounted winch, heater and/or air conditioning system and various weapon systems.

## VARIANTS

AIFV, two man 20mm or 25mm turret  
Fire support vehicle, two man 90mm turret  
Internal security, wide range of equipment  
Anti-tank, HOT or TOW ATGW  
Mortar, 81mm on turntable

## STATUS

In production. In service with Philippines Armed Forces.

## MANUFACTURER

Alvis Vehicles Limited, Telford, Shropshire, England, UK.





*Top left: Alvis Vehicles  
Simba*

*Top right: Alvis  
Vehicles Simba*

*Left: Alvis Vehicles  
Simba fitted with 7.62  
mm MG*

*Right: Alvis Vehicles  
Simba fitted with 7.62  
mm MG*



# Cadillac Gage Ranger APC (USA)

## KEY RECOGNITION FEATURES

- Vertical hull front with horizontal armoured radiator louvres, horizontal bonnet top which then slopes upwards to crew compartment, horizontal roof and almost vertical hull rear
- Single door in each hull side with firing port and vision block, twin doors in rear each with firing port, left door also has vision block and ventilator
- Two road wheels each side with hull sides above road wheels sloping slightly inwards

## SPECIFICATIONS

|                         |                                                                     |
|-------------------------|---------------------------------------------------------------------|
| Crew:                   | 2+6                                                                 |
| Configuration:          | 4x4                                                                 |
| Armament:               | 1 x 7.62mm MG                                                       |
| Ammunition:             | 1,000 x 7.62mm                                                      |
| Length:                 | 4.699m                                                              |
| Width:                  | 2.019m                                                              |
| Height:                 | 1.981m                                                              |
| Ground clearance:       | 0.203m                                                              |
| Wheelbase:              | 2.641m                                                              |
| Weight, combat:         | 4,536kg                                                             |
| Power-to-weight ratio:  | 40hp/tonne                                                          |
| Engine:                 | Dodge 360 CID V-8 liquid-cooled petrol developing 180hp at 3,600rpm |
| Maximum road speed:     | 112.65km/hr                                                         |
| Maximum road range:     | 482km                                                               |
| Fuel capacity:          | 121 lit                                                             |
| Fording:                | 0.60m                                                               |
| Vertical obstacle:      | 0.254m                                                              |
| Trench:                 | Not applicable                                                      |
| Gradient:               | 60%                                                                 |
| Side slope:             | 30%                                                                 |
| Armour:                 | 7mm (maximum)(estimate)                                             |
| Armour type:            | Steel                                                               |
| NBC system:             | None                                                                |
| Night vision equipment: | None                                                                |

## DEVELOPMENT

Ranger was developed as a private venture in the late 1970s and following completion was selected by the US Air Force for a Security Police Armored Response/Convoy Truck to patrol air

bases and other high value targets. First production vehicles completed in 1980 and by 1995 over 700 were built.

It is essentially a Chrysler truck chassis with a shorter wheelbase fitted with armoured body for protection from small arms fire and shell splinters. Engine is front, commander and driver to rear and crew compartment far rear.

Basic vehicle is fitted with roof-mounted 7.62mm MG which normally has a shield, but a wide range of other weapon systems can be installed including turret with twin 7.62mm MG or turret with one 7.62mm and 12.7mm MG. The turret has manual traverse through a full 360° with weapon elevation being from -14° to +55°. Luxembourg has five vehicles with this turret armed with twin 7.62mm MGs.

Standard equipment includes air-conditioning system and heater, optional equipment includes grenade launchers, flashing lights, spotlight and front-mounted winch.

## VARIANTS

In addition to different weapon stations, Ranger can be used as command post vehicle, ambulance and light reconnaissance vehicle.

## STATUS

Production complete. In service with Indonesia, Luxembourg and USA (Air Force and Navy). In US Air Force the Ranger is being replaced by the M116 (4x4) armoured personnel carrier based on an AM General HMMWV (4x4) chassis with additional armour.

## MANUFACTURER

Textron Marine ft Land Systems, New Orleans, Louisiana, USA.

*Main picture: Ranger in  
command post role*

*Inset: Ranger in police role*



# Cadillac Gage ASV 150 (USA)

## KEY RECOGNITION FEATURES

- Very similar in appearance to LAV-150 (4 x 4) and Dragoon (4 x 4) covered in following entries but has different hull shape with engine left rear and applique armour
- Pointed hull front with horizontal roof, hull sides above rear wheel arches slope inwards, hull rear slopes inwards with horizontal louvres on left side and two part hatch on right side
- Two large road wheels each side with two-part hatch between which has firing port and window in upper part, turret in centre of hull roof

## SPECIFICATIONS

|                         |                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------|
| Crew:                   | 1 + 3                                                                                   |
| Armament:               | 1 x 40mm grenade launcher,<br>1 x 12.7mm MG (coaxial),<br>2 x 4 smoke grenade launchers |
| Ammunition:             | 600 x 40mm, 800 x 12.7mm                                                                |
| Length hull:            | 6.22m                                                                                   |
| Width:                  | 2.56m                                                                                   |
| Height overall:         | 2.59m                                                                                   |
| Height hull roof:       | 2.46m                                                                                   |
| Ground clearance:       | 0.45m                                                                                   |
| Weight, combat:         | 13,408kg                                                                                |
| Weight, empty:          | 11,884kg                                                                                |
| Power-to-weight ratio:  | 19.39hp/tonne                                                                           |
| Ground pressure:        | n/available                                                                             |
| Engine:                 | Cummins 6CTA 8.3 turbocharged diesel developing 260hp at 2200rpm                        |
| Maximum road speed:     | 100km/h                                                                                 |
| Maximum road range:     | 708km                                                                                   |
| Fuel capacity:          | 264l                                                                                    |
| Fording:                | 1.50m                                                                                   |
| Vertical obstacle:      | 0.60m                                                                                   |
| Trench:                 | Not applicable                                                                          |
| Gradient:               | 60%                                                                                     |
| Side slope:             | 30°/o                                                                                   |
| Armour:                 | Classified                                                                              |
| Armour type:            | Steel plus composite                                                                    |
| NBC system:             | Yes                                                                                     |
| Night vision equipment: | Yes                                                                                     |

## DEVELOPMENT

The Cadillac Gage ASV 150 was developed by Textron Marine ft Land Systems to meet the requirements of the US Army Military Police for an Armored Security Vehicle (ASV). Following trials with prototype vehicles the first production order was placed in early 1999 for 94 vehicles under the US Army designation of the XM1117. First production vehicles will be delivered in the second quarter of the year 2000.

The ASV 150 is a further development of the Cadillac Gage Textron LAV-150 ST and in future the ASV 150 will be the only vehicle offered by the company.

The ASV 150 has many improvements over the LAV-150 ST including the replacement of older suspension by a new fully independent suspension which gives an improved ride over rough terrain. The steel hull is fitted with applique passive armour developed by the German company of IBD.

The commander and driver are seated at the front with the turret in the centre, powerpack at the left rear and narrow aisle at the right rear.

The one person power operated turret is armed with a 40 mm Mk 19 grenade launcher and a 12.7mm M2 machine gun. Turret traverse is a full 360 degrees with elevation from -8 to +48 degrees.

Standard equipment includes a fire detection and suppression system and a front mounted power operated winch. A central tyre pressure regulation system is fitted as standard which allows the driver to adjust the tyre pressure to suit the type of terrain being crossed.



#### VARIANTS

There are no variants of the ASV 150 so far but in the future it is expected that the vehicle will be capable of being fitted with a wide range of armament systems up to and including a two person turret armed with a 90 mm gun. An NBC reconnaissance version is also projected.

*Above: ASV 150*

*Top right: ASV 150*

*Right: ASV 150*



#### STATUS

Entering production for US Army.

#### MANUFACTURER

Textron Marine Et Land Systems, New Orleans, Louisiana, USA.

# Cadillac Gage LA V-150 AFV Range (USA)

## KEY RECOGNITION FEATURES

- Very similar in appearance to Dragoon (qv) except engine is left side at rear, not right
- Pointed hull front with horizontal roof, hull sides above curved wheel arches slope inwards, hull back cut off top and bottom and points ti'ir
- Two large road wheels each side with two-part hatch between, similar hatch right rear, armament mounted on hull roof centre of vehicle

## SPECIFICATIONS

|                         |                                                                                                          |
|-------------------------|----------------------------------------------------------------------------------------------------------|
| Crew:                   | <b>3+2</b>                                                                                               |
| Configuration:          | <b>4x4</b>                                                                                               |
| Armament:               | <b>1 x 20mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 2 x 6 smoke grenade dischargers</b> |
| Ammunition:             | <b>400 x 20mm, 3,200 x 7.62mm</b>                                                                        |
| Length:                 | <b>5.689m</b>                                                                                            |
| Width:                  | <b>2.26m</b>                                                                                             |
| Height:                 | <b>2.54m (turret roof), 1.981m (hull roof)</b>                                                           |
| Ground clearance:       | <b>0.381m (axles), 0.648m (hull)</b>                                                                     |
| Wheelbase:              | <b>2.667m</b>                                                                                            |
| Weight, combat:         | <b>9,888kg</b>                                                                                           |
| Power-to-weight ratio:  | <b>20.42bhp/tonne</b>                                                                                    |
| Engine:                 | <b>V-504 V-8 diesel developing 202bhp at 3,300rpm</b>                                                    |
| Maximum road speed:     | <b>88.54km/hr</b>                                                                                        |
| Maximum water speed:    | <b>60km/hr</b>                                                                                           |
| Maximum range:          | <b>643km</b>                                                                                             |
| Fuel capacity:          | <b>303 lit</b>                                                                                           |
| Fording:                | <b>Amphibious</b>                                                                                        |
| Vertical obstacle:      | <b>0.609m</b>                                                                                            |
| Trench:                 | <b>Not applicable</b>                                                                                    |
| Gradient:               | <b>60%</b>                                                                                               |
| Side slope:             | <b>30%</b>                                                                                               |
| Armour:                 | <b>Classified</b>                                                                                        |
| Armour type:            | <b>Steel</b>                                                                                             |
| NBC system:             | <b>None</b>                                                                                              |
| Night vision equipment: | <b>Optional</b>                                                                                          |

## DEVELOPMENT

In 1962 Cadillac Gage (now Textron Marine ft Land Systems) started private venture development work on a 4x4 which became known as LAV-100, first prototype completed in 1963 and first production vehicle in 1964. It was powered by a Chrysler petrol engine and used on a large scale in South Vietnam. A scaled-up version, LAV-200, was also built but was sold only to Singapore.

In 1971 LAV-100 and LAV-200 were replaced in production by LAV-150 with a number of improvements including replacement of petrol engine by diesel. In 1985 LAV-150 was replaced in production by LAV-160S which has longer wheelbase and therefore greater weight. So far over 3,200 vehicles have been built.

In all versions commander and driver are at front with troop compartment extending to rear except for engine compartment left rear. All versions are fully amphibious, propelled by their wheels, have a front-mounted winch and run-flat tyres. A wide range of armament can be fitted as well as other specialised equipment.

## VARIANTS

These are many and include turret with twin 7.62mm or one 7.62mm and one 12.7mm **MG**, turret with 20mm cannon and 7.62mm MG (one- or two-man versions), two-man turret with 25mm cannon and 7.62mm MG, one-man turret with 40mm grenade launcher and 12.7mm MG, anti-aircraft with 20mm Vulcan cannon, two-man turret with 90mm gun and 7.62mm coaxial and 7.62mm AA MG, 81mm mortar carrier, TOW ATGW, command or ARC with pod, recovery, base security, ambulance and emergency rescue vehicle.

US Army designation is M706 and some are used as surrogate

Soviet systems such as SA-9.

There is also a 6x6 version, Commando LAV-300 (qv).

Singapore has a number of variants of LAV-200 including recovery and air defence with RBS-70 SAM.

Armoured Security Vehicle, this is a further development of the LAV-150 and is covered in a separate entry.

### STATUS

Production complete. In service with Bolivia (LAV100), Botswana (LAV-150), Cameroon (LAV-150), Chad (LAV-150S), Dominican Republic (LAV-150), Gabon (LAV-150), Guatemala (LAV-150), Haiti (LAV-150), Indonesia (LAV-150), Jamaica (LAV-150), Kuwait (LAV-150S)\*, Malaysia (LAV-100 and LAV-150), Mexico (LAV-150 ST), Philippines (LAV-150), Saudi Arabia (LAV-150), Singapore (LAV-150 and LAV-200), Somalia, Sudan (LAV-150 and LAV-150 S), Taiwan (LAV-150), Thailand (LAV-150), Turkey (LAV-150), USA (LAV-100), Venezuela (LAV-150) and Vietnam (LAV-100)\*.

(\* status uncertain)

### MANUFACTURER

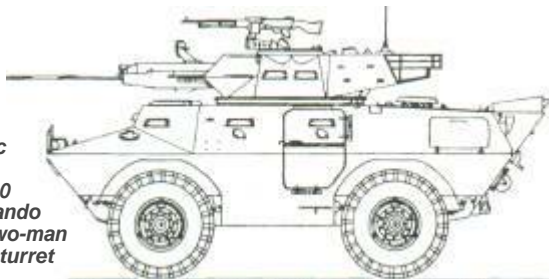
Trextron Marine ft Land Systems, New Orleans, Louisiana, USA.



*Top: Cadillac Gage LAV-200 Commando*

*Above: Cadillac Gage LAV-150 Commando with turret mounted 90mm gun*

*Cadillac Gage LAV-150 Commando with two-man 20mm turret*





# AV Technology Dragoon Armoured Vehicle (USA)

## KEY RECOGNITION FEATURES

- Similar in appearance to Cadillac Gage (now Textron Marine 6t Land Systems) LAV-100/LAV-150 (4x4) vehicles except that engine is on right side rear, not left
- Pointed front with almost horizontal roof, hull sides above curved wheel arches slope inwards, hull back slopes to rear at about 60°
- Two large road wheels each side with two-part hatch between similar hatch left rear, armament mounted on hull roof centre of vehicle

## SPECIFICATIONS

|                         |                                                                                                  |
|-------------------------|--------------------------------------------------------------------------------------------------|
| Crew:                   | 3+6                                                                                              |
| Configuration:          | 4x4                                                                                              |
| Armament:               | 1 x 20mm cannon, 1 x 7.62mm MG (coaxial)                                                         |
| Length:                 | 5.89m                                                                                            |
| Width:                  | 2.49m                                                                                            |
| Height:                 | 2.819m overall                                                                                   |
| Ground clearance:       | 0.685m (hull centre), 0.381m (axles)                                                             |
| Wheelbase:              | 3.10m                                                                                            |
| Weight, combat:         | 12,700kg                                                                                         |
| Weight, empty:          | 11,204kg                                                                                         |
| Power-to-weight ratio:  | 23.62bhp/tonne                                                                                   |
| Engine:                 | Detroit Diesel 6V-53T 6-cylinder liquid-cooled turbocharged diesel developing 300bhp at 2,800rpm |
| Maximum road speed:     | 115.9km/hr                                                                                       |
| Maximum water speed:    | 5.6km/hr                                                                                         |
| Maximum road range:     | 885km                                                                                            |
| Fuel capacity:          | 350 lit                                                                                          |
| Fording:                | Amphibious                                                                                       |
| Vertical obstacle:      | 0.609m                                                                                           |
| Trench:                 | Not applicable                                                                                   |
| Gradient:               | 60%                                                                                              |
| Side slope:             | 30°/o                                                                                            |
| Armour:                 | Classified                                                                                       |
| Armour type:            | Steel                                                                                            |
| NBC system:             | Optional                                                                                         |
| Night vision equipment: | Optional                                                                                         |

## DEVELOPMENT

Dragoon AFV family was originally developed by the Verne Corporation to meet requirements of the US Army Military Police. The requirement subsequently lapsed and the company built two prototypes first shown in 1978. A small quantity of vehicles was built for the US Army and Navy in 1982. The US Army vehicles were supplied to the 9th Infantry Division High Technology Test Bed in two versions, electronic warfare and optical surveillance. The US Navy uses them for patrolling nuclear weapon storage sites. AV Technology is now own by General Dynamics Land Systems.

To reduce life-cycle and procurement costs Dragoon uses components of M113A2 full-tracked ARC and M809 5-ton (6x6) truck.

Commander and driver sit front with troops carried to rear, wide range of weapon stations mounted on hull top up to 90mm KEnerga gun with 7.62mm coaxial MG in power-operated turret.

Dragoon is fully amphibious, propelled by its wheels, standard equipment includes front-mounted winch and wide range of optional equipment.

In 1984 the Verne Corporation and the Arrowpointe Corporation merged to form AV Technology Corporation and since then the vehicle has been further developed into the following basic versions: ARC, Patroller armoured security vehicle, armoured command vehicle, 81mm armour mortar carrier, 90mm turret, 40mm/12.7mm turret, armoured maintenance vehicle, electronic warfare, armoured logistic support vehicle and TOW ATGW carrier.

Latest production model is the Dragoon 2 which has many improvements.

### VARIANTS

Dragoon can be used for wide range of roles including ARC, reconnaissance, recovery, command/communications, riot control, engineer, security/escort, 81mm mortar carrier, anti-tank with TOW, ambulance and logistics.

### STATUS

Production as required. In service with US forces, Thailand, Turkey, Venezuela and a number of civil authorities.

### MANUFACTURER

AV Technology, Michigan, USA.



*Above: Dragoon APC  
with 12.7mm MG*

*Left: Dragoon Patroller  
armoured security  
vehicle*

*Right: Dragoon with  
two-man 90mm turret*



# Cadillac Gage Scout (USA)

## KEY RECOGNITION FEATURES

- Nose slopes back at 45° to first road wheel station, well sloped glacis plate which extends half way along to horizontal roof at rear on which turret is mounted
- Driver's hatch upper left side of glacis plate with air louvres to right, exhaust pipe right side of hull, two-part hatch in hull rear
- Two large road wheels each side with hull sides sloping inwards top and bottom

## SPECIFICATIONS

|                         |                                                 |
|-------------------------|-------------------------------------------------|
| Crew:                   | 1+1 or 1+2                                      |
| Configuration:          | 4x4                                             |
| Armament:               | 2 x 7.62mm MG                                   |
| Ammunition:             | 2,600 x 7.62mm                                  |
| Length:                 | 5.003m                                          |
| Wheelbase:              | 2.743m                                          |
| Width:                  | 2.057m                                          |
| Track:                  | 1.660m                                          |
| Height:                 | 2.159m                                          |
| Weight, combat:         | 7240kg                                          |
| Power-to-weight ratio:  | 20.58hp/tonne                                   |
| Engine:                 | Cummins V-6 diesel developing 155hp at 3,300rpm |
| Maximum road speed:     | 88km/hr                                         |
| Maximum road range:     | 846km                                           |
| Fuel capacity:          | 378 lit                                         |
| Fording:                | 1.168m                                          |
| Vertical obstacle:      | 0.609m                                          |
| Trench:                 | 1.14m                                           |
| Gradient:               | 60o/o                                           |
| Side slope:             | 30o/o                                           |
| Armour:                 | 8mm (maximum)(estimate)                         |
| Armour type:            | Steel                                           |
| NBC system:             | None                                            |
| Night vision equipment: | None                                            |

## DEVELOPMENT

Commando Scout (4x4) was developed as a private venture by Cadillac Gage (now part of Textron Marine Et Land Systems), the first prototype shown in 1977. Although its main role is reconnaissance it is suitable for a wide range of roles with little

modification, such as anti-tank and command post. In 1983 Indonesia ordered 28 Commando Scouts and in 1986 Egypt ordered 112, all of which were delivered by mid-1987.

The fuel tank is at the front, driver to immediate rear on left side, engine to his right. The turret is mounted rear, gunner enters via turret hatch cover or via two-part hatch in hull rear, upper part opens upwards and lower part downwards.

Standard equipment includes run-flat tyres, power steering and air compressor with 15.24m hose. Optional equipment includes siren/public address system, various radio installations, slave cable, auxiliary cable, smoke grenade system and fragmentation grenade system as well as a wide range of turrets.

## VARIANTS

40mm/12.7mm turret armed with 40mm grenade launcher and 12.7mm MG as fitted to US Marine Corps AAV7A1 vehicles. Twin/combination MG (1m) Cadillac Gage turret with twin 7.62mm or twin 12.7mm MG or combination of both. Turret traverses 360°, weapon elevates from -10° to +55°.

Command pod with three-man crew (driver, commander and radio operator) and raised pod on which a 7.62mm or 12.7mm MG is mounted.

Anti-tank with Raytheon Systems Company TOW ATGW launcher with one missile in ready-to-launch position and six missiles in reserve.

## STATUS

Production complete. Can be placed back into production. In service with Egypt and Indonesia.

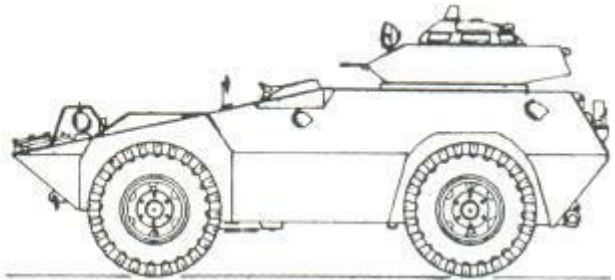
## MANUFACTURER

Textron Marine Et Land Systems, New Orleans, Louisiana, USA.

4x4 VEHICLES



*Above: Commando Scout with  
Command Pod and 7.62mm MG*



*Top right: Commando Scout with  
1m turret and twin 7.62mm MG*

*Right: Commando Scout with 1m  
pod and one 7.62mm/one  
12.7mm MG*



# O'Gara-Hess M114 armoured vehicle(USA)

## KEY RECOGNITION

### FEATURES

- Vertical hull front with vertical louvres with headlamp either side, slightly sloping bonnet leads up to vertical armoured windsceen. Horizontal roof with rear sloping downwards to vertical hull rear
- Sides are vertical with two forward opening doors in each side with a square window in the upper part. Wheels are at extreme ends of vehicle
- Armament is mounted in centre of roof and on some models will be seen fitted with a shield

## SPECIFICATIONS

|                         |                                                       |
|-------------------------|-------------------------------------------------------|
| Crew:                   | 1 +3                                                  |
| Armament:               | 1 x 12.7 mm MG typical)                               |
| Ammunition:             | 1000 x 12.7 mm typical)                               |
| Length hull:            | 4.99m                                                 |
| Width:                  | 2.3m                                                  |
| Height:                 | 1.9m                                                  |
| Ground clearance:       | 0.30m                                                 |
| Weight, combat:         | 5,489kg                                               |
| Weight, empty:          | 4,445kg                                               |
| Power-to-weight ratio:  | 34.61 hp/tonne                                        |
| Ground pressure:        | Not ;iv;iil;iblf                                      |
| Engine:                 | V-8 turbocharged diesel developing 190 hp at 3,400rpm |
| Maximum road speed:     | 125km/h                                               |
| Maximum road range:     | 443km                                                 |
| Fuel capacity:          | 94!                                                   |
| Fording:                | 0.762m                                                |
| Vertical obstacle:      | Not available                                         |
| Trench:                 | Not available                                         |
| Gradient:               | 600!0                                                 |
| Side slope:             | 40%                                                   |
| Armour:                 | Classified                                            |
| Armour type:            | Classified                                            |
| NBC system:             | No                                                    |
| Night vision equipment: | No                                                    |

## DEVELOPMENT

The M114 is essentially a recent production AM General High Mobility Multi-purpose Wheeled Vehicle HMMWV) 4x4) up-armoured by the O'Gara-Hess Et Eisenhardt Armoring Company to provide the occupants with protection from 7.62 mm armour

piercing attack through a full 360 degrees, shell splinters and mines.

The first examples were completed in 1994 and by late 1999 over 1,800 had been built for the home and export markets.

The layout of the M114 is similar to the HMMWV with the engine at front, crew compartment in centre and load area at rear. Access to the latter is via an upward opening hatch. The vehicle is normally left hand drive with the vehicle commander to the right and another two people seated to the rear.

Mounted on the roof of the vehicle is a hatch on which various types of weapon can be installed such as 7.62mm or 12.7mm machine gun or a 40mm automatic grenade launcher. Standard equipment includes an air conditioning system, powered steering and an automatic transmission. Options include passive night vision equipment.

## VARIANTS

The US Air Force has a further development of the M114 called the M116 which is used for a number of missions including Security Police, Civil Engineer and Explosive Ordnance Disposal Base Recovery After Attack.

## STATUS

Production. In service with Luxembourg, Qatar and the United States.

## MANUFACTURER

O'Gara-Hess Et Eisenhardt Armoring Company, Ohio, USA

*Right: M1 1 14 armoured HMMWV without armament installed*







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# **6x6 VEHICLES**

# Steyr-Daimler-Puch Pandur APC (Austria)

## KEY RECOGNITION FEATURES

- Box-like hull with nose sloping back under front of vehicle, well sloped glacis plate with driver to left rear and engine compartment to the right. Horizontal hull top extends to rear
- Upper part of hull sides above road wheels slope inwards with optional firing ports/vision devices in either suit<sup>1</sup>
- Three road wheels either side with equal space between them

## SPECIFICATIONS

|                         |                                                                              |
|-------------------------|------------------------------------------------------------------------------|
| Crew:                   | 2 + 8                                                                        |
| Configuration:          | 6 x 6                                                                        |
| Armament:               | 1 x 12.7mm MG, 2 x 3 smoke grenade launchers                                 |
| Ammunition:             | 1000 x 12.7mm                                                                |
| Length:                 | 5.697m                                                                       |
| Width:                  | 2.5m                                                                         |
| Height:                 | 1.82m                                                                        |
| Ground clearance:       | 0.43m                                                                        |
| Wheelbase:              | 1.53m + 1.53m                                                                |
| Weight, combat:         | 13,500kg                                                                     |
| Weight, empty:          | 10,300kg                                                                     |
| Power-to-weight ratio:  | 19.25 hp/tonne                                                               |
| Engine:                 | Steyr WD 612.95 6-cylinder turbocharged diesel, developing 260 hp at 2400rpm |
| Maximum road speed:     | 100km/h                                                                      |
| Maximum road range:     | 700km                                                                        |
| Fuel capacity:          | 275l                                                                         |
| Fording:                | 1.2m                                                                         |
| Vertical obstacle:      | 0.5m                                                                         |
| Trench:                 | 1.1m                                                                         |
| Gradient:               | 70°/o                                                                        |
| Side slope:             | 40°/o                                                                        |
| Armour:                 | 8mm (estimate)                                                               |
| Armour type:            | Steel                                                                        |
| NBC system:             | Yes                                                                          |
| Night vision equipment: | Yes                                                                          |

a private venture by Steyr-Daimler-Puch. The first prototypes were shown in 1985 and in 1994 the Austrian army ordered 68 Pandurs for use by Austrian forces serving with the UN.

Deliveries began in 1995.

The driver is seated front left, with the commander to his rear and the engine compartment to the right. The troop compartment extends to the rear and has roof hatches and firing ports/vision devices. The version for the Austrian army has a raised rear troop compartment with spall liners, mine protection mats and a heater. The commander/gunner has a 12.7mm machine gun in a protected position.

Standard equipment includes power steering, fire detection and suppression systems and a central tyre pressure regulation system. An amphibious version has been developed.

## VARIANTS

Ambulance

Anti-aircraft

Anti-tank (HOT or TOW)

Armoured reconnaissance scout vehicle (30 mm)

Armoured reconnaissance fire support vehicle (90 mm)

Command and control vehicle

Mechanised Infantry Combat Vehicle

Reconnaissance vehicle

Amphibious model has longer hull and more powerful engine.

## STATUS

Production. In service or on order for Austria, Belgium, Kuwait, Slovenia and United States.

## DEVELOPMENT

The Pandur 6 x 6 armoured personnel carrier was developed as

## MANUFACTURER

Steyr-Daimler-Puch, Vienna, Austria.



*Above:*  
Pandur with 90mm  
turret

*Right:*  
Amphibious  
Pandur

*Top right:*  
Pandur with  
12.7mm MG

*427/d*  
Pandur with 25mm  
turret



# SIBMAS APC (Belgium)

## KEY RECOGNITION FEATURES

- Long box-shaped hull, driver front, large windows to front and sides, horizontal roof, hull rear slopes inwards with engine compartment left and entry door right rear
- Hatch over driver's position, turret to immediate rear of driver's position, three rectangular roof hatches to turret rear, one left and two right. Externally mounted 7.62mm anti-aircraft MG on roof at right rear
- Three large mad wheels, forward-opening door each side of hull to rear of first road wheel station, two rear road wheels close together

## SPECIFICATIONS

|                                      |                                                                                              |
|--------------------------------------|----------------------------------------------------------------------------------------------|
| Crew:                                | 3+11                                                                                         |
| Configuration:                       | 6x6                                                                                          |
| Armament:                            | Depends on role                                                                              |
| Ammunition:                          | Depends on role                                                                              |
| Length, hull:                        | 7.32m                                                                                        |
| Width:                               | 2.5m                                                                                         |
| Height, turret top:                  | 2.77m                                                                                        |
| Height, hull top:                    | 2.24m                                                                                        |
| Ground clearance:                    | 0.4m                                                                                         |
| Wheelbase:                           | 2.8m + 1.4m                                                                                  |
| Weight combat:                       | 14,500 to 18,500kg (depends on role)                                                         |
| Weight, unloaded:                    | 13,200kg (eg without turret)                                                                 |
| Power-to-weight ratio (at 16,000kg): | 20hp/tonne                                                                                   |
| Engine:                              | MAN D 2566 MK 6-cylinder in-line water-cooledturbochargeddiesel developing 320hp at 1,900rpm |
| Maximum road speed:                  | 100km/hr                                                                                     |
| Maximum water speed (wheels):        | 4km/hr                                                                                       |
| Maximum water speed (propellers):    | 11km/hr                                                                                      |
| Maximum road range:                  | 1,000km                                                                                      |
| Fuel capacity:                       | 400 lit                                                                                      |
| Fording:                             | Amphibious                                                                                   |
| Vertical obstacle:                   | 0.7m                                                                                         |
| Trench:                              | 1.5m                                                                                         |
| Gradient:                            | 70%                                                                                          |
| Side slope:                          | 40%                                                                                          |
| Armour:                              | Classified                                                                                   |
| Armour type:                         | Steel                                                                                        |
| NBC system:                          | Optional                                                                                     |
| Night vision equipment:              | Optional                                                                                     |

## DEVELOPMENT

SIBMAS (6x6) wheeled armoured vehicle range was designed as a private venture from 1975 by BN Constructions Ferroviaires et Metalliques, first prototype completed in 1976. In appearance SIBMAS is similar to the South African Ratel (6x6) infantry fighting vehicle (qv).

In 1981 Malaysia ordered 196 SIBMAS vehicles, delivered between 1983 and 1985 in two versions, 162 Armoured Fire Support Vehicle 90s (AFSV-90) with CM 90 turret, and 24 ARVs. In mid-1985 the SIBMAS Division of BN was transferred to Belgian Mechanical Fabrication. The SIBMAS production line was closed some time ago and the vehicle is no longer being marketed.

Drivers sits front with weapon station on roof to his rear, troop compartment extends to rear of hull, engine compartment is left rear of vehicle. Three entry doors, one in each side and one at rear, and three roof hatches. Troop compartment has firing ports and vision devices.

Standard equipment includes run-flat tyres, optional equipment includes night vision equipment, propellers, winch, heater, air-conditioning system and NBC pack. Wide range of turrets including twin 7.62mm MG, 20mm cannon, twin 20mm anti-aircraft, up to two-man turret with 90mm gun,

## VARIANTS

SIBMAS can be adapted for a wide range of roles including mortar carrier, cargo vehicle, command post, ambulance, and recovery (used by Malaysia, with 20,000kg winch, 10,500kg crane and front and rear stabilising blades).

AFSV-90 has two-man CM 90 turret armed with 90mm Cockerill gun with 7.62mm coaxial and 7.62mm anti-aircraft MG and eight smoke/fragmentation grenade launchers each side of turret.

**STATUS**

Production complete. In service with Malaysia only.

**MANUFACTURER**

Cockerill Mechanical Industrie:

*Above SIBMAS (6x6)  
ARV*

*Above right: SIBMAS  
(6x6) with CM 90 turret*

*Right: SIBMAS (6x6)  
with CM 90 turret*



# ENGESA EE-11 Urutu APC (Brazil)

## KEY RECOGNITION FEATURES

- Nose slopes back to just forward of front road wheels at 60°, recessed headlamps, glacis plate has driver's position left and engine compartment right, horizontal roof and vertical hull rear, large door in rear opening to left
- Hull sides vertical half-way up then slope slightly inwards to hull roof, single door on left side of hull to rear of first road wheel station, earlier Mk's have door in each side, four outward-opening roof hatches over rear troop compartment
- Three road wheels each side with rear wheels close together, ENGESA boomerang suspension which keeps both wheels in contact with ground

## SPECIFICATIONS (MKVII)

|                         |                                                                                   |
|-------------------------|-----------------------------------------------------------------------------------|
| Crew:                   | 1 + 12                                                                            |
| Configuration:          | 6x6                                                                               |
| Armament:               | 1 x 12.7mm MG, 2 x 2 smoke grenade dischargers                                    |
| Ammunition:             | 1,000 x 12.7mm                                                                    |
| Length:                 | 6.1m                                                                              |
| Width:                  | 2.65m                                                                             |
| Height top of MG mount: | 2.9m                                                                              |
| Height hull top:        | 2.125m                                                                            |
| Ground clearance:       | 0.38m                                                                             |
| Wheelbase:              | 3.05m                                                                             |
| Weight, combat:         | 14,000kg                                                                          |
| Weight, unloaded:       | 11,000kg                                                                          |
| Power-to-weight ratio:  | 18.6hp/tonne                                                                      |
| Engine:                 | Detroit Diesel 6V-53T 6-cylinder water-cooled diesel developing 260hp at 2,800rpm |
| Maximum road speed:     | lubkm/hr                                                                          |
| Maximum water speed:    | 8km/hr                                                                            |
| Maximum road range:     | 850km                                                                             |
| Fuel capacity:          | 380 lit                                                                           |
| Fording:                | Amphibious                                                                        |
| Vertical obstacle:      | 0.6m                                                                              |
| Trench:                 | Not applicable                                                                    |
| Gradient:               | 60%                                                                               |
| Side slope:             | 30%                                                                               |
| Armour:                 | Classified                                                                        |
| Armour type:            | Steel (2 layers)                                                                  |
| NBC system:             | Optional                                                                          |
| Night vision equipment: | Optional                                                                          |

## DEVELOPMENT

EE-11 Urutu (6x6) was developed to meet the requirements of Brazilian Army with first prototype completed in 1970 and first production vehicles in 1974. It shares many automotive components with ENGESA EE-9 Cascavel (6x6) armoured car developed at the same time. ENGESA is no longer trading.

All vehicles have same basic layout with driver front left, engine to right and troop compartment extending back to rear. Troops enter and leave via door in each side and one in rear (except on Mk V which has no door in right side owing to larger engine compartment). Armament is usually mounted to rear of driver and ranges from pintle-mounted 7.62mm or 12.7mm MG to turret with 60mm breech-loaded mortar or 25mm cannon. Over top of troop compartment are four roof hatches.

EE-11 Urutu has had seven marks, 1, II, III, IV, V, VI and VII, main difference being the engine (Mercedes-Benz or Detroit Diesel) and transmission (manual or automatic). Late production vehicles have run-flat tyres and central tyre pressure regulation system. The Mark VII has the turbocharged diesel in place of the standard 6V-53 developing 212hp installed in the Mk III. Vehicle is fully amphibious, propelled by its wheels. Before entering the water a trim vane is erected at front of hull. Wide range of optional equipment was available including firing ports, vision blocks, 5,000kg capacity winch, NBC system and night vision devices.

## VARIANTS

In addition to armament options, the following versions were available: 81mm mortar carrier, ambulance with higher roof, cargo carrier, armoured fire support vehicle with 90mm turret as fitted to EE-9 Cascavel armoured car, command post vehicle, recovery vehicle, anti-aircraft vehicle with twin 20mm cannon, and internal security vehicle with obstacle-clearing blade at front of hull.



**STATUS**

Production complete. Known users include Angola, Bolivia, Brazil (Army and Marines), Chile, Colombia, Cyprus, Ecuador, Gabon, Guyana, Iraq, Jordan, Libya, Nigeria, Paraguay, Surinam, Tunisia, United Arab Emirates, Uruguay and Venezuela.

**MANUFACTURER**

ENGESA, Sao Jose dos Campos, Brazil.



*Above: ENGESA EE-11 Urutu (6x6) with 90mm turret*



*Left: ENGESA EE-11 Urutu (6x6) with one-man machine gun turret*

# ENGESA ££-9 Cascavel Armoured Car (Brazil)

## KEY RECOGNITION FEATURES

- Nose slopes back under hull with recesses in upper part for headlamps, well-sloped glacis plate leads up to horizontal hull top which extends to rear, driver's position front left, turret centre, engine rear. Vertical hull rear with horizontal air louvres

- Turret has flat sides and rear which slope slightly inwards, smoke grenade dischargers mounted each side at rear, 90mm barrel has muzzle brake with three vertical slots, commander's cupola on left side of turret roof

- Three road wheels each side (rear two mounted close together on boomerang suspension to maintain contact with ground)

## SPECIFICATIONS (MK IV)

|                                      |                                                                                                             |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Crew:                                | 3                                                                                                           |
| Configuration:                       | 6 x 6                                                                                                       |
| Armament:                            | 1 x 90mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm or 12.7mm MG (anti-aircraft), 2 x 3 smoke grenade dischargers |
| Ammunition:                          | 44 x 90mm, 2,200 x 7.62mm                                                                                   |
| Length gun forwards:                 | 6.2m                                                                                                        |
| LejTgthJiuM:~                        | 5.2m                                                                                                        |
| Width:                               | 2.64m                                                                                                       |
| Height to top of commander's cupola: | 2.68m                                                                                                       |
| Height to turret roof:               | 2.28m                                                                                                       |
| Ground clearance:                    | 0.34m (front axle)                                                                                          |
| Ground clearance:                    | 0.5m (hull centre)                                                                                          |
| Wheelbase:                           | 2.343m + 1.414m                                                                                             |
| Weight, combat:                      | 13,400kg                                                                                                    |
| Weight, empty:                       | 10,900kg                                                                                                    |
| Power-to-weight ratio:               | 15.82hp/tonne                                                                                               |
| Engine:                              | Detroit Diesel model 6V-53N 6-cylinder water-cooled diesel developing 212hp at 2,800rpm                     |
| Maximum road speed:                  | 100km/hr                                                                                                    |
| Maximum range:                       | 880km                                                                                                       |
| Fuel capacity:                       | 390 lit                                                                                                     |
| Fording:                             | 1m                                                                                                          |
| Vertical obstacle:                   | 0.6m                                                                                                        |
| Trench:                              | Not applicable                                                                                              |
| Gradient:                            | 60°/o                                                                                                       |
| Side slope:                          | 30%                                                                                                         |
| Armour:                              | Classified                                                                                                  |
| Armour type:                         | Steel (2 layers)                                                                                            |

|                         |                                                     |
|-------------------------|-----------------------------------------------------|
| NBC system:             | None                                                |
| Night vision equipment: | Optional (passive for commander, gunner and driver) |

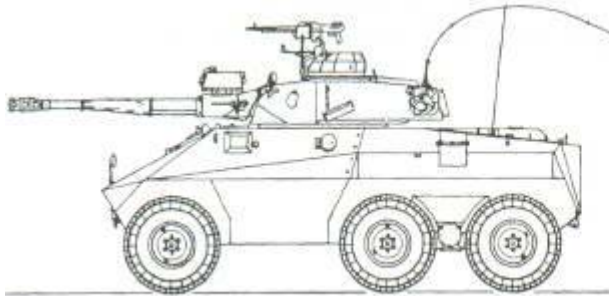
## DEVELOPMENT

EE-9 Cascavel (6x6) was developed by ENGESA to meet the requirements of the Brazilian Army and shares many common components with EE-11 Urutu (6x6) ARC developed about the same time. First prototypes of EE-9 were completed in November 1970, pre-production vehicles following in 1972/73 and first production vehicles in 1974.

First production vehicles for the Brazilian Army had 37mm guns, while those for export had a French 90mm turret as installed on the AML 90 (4x4) armoured car. For some years all production EE-9s have had an ENGESA ET-90 turret armed with an ENGESA EC-90 gun.

Marks I, II, III, IV and V of EE-9 Cascavel have been built so far by ENGESA. Layout of all vehicles is similar with driver front left, two-man turret centre, engine and transmission rear. Turret has a 90mm gun which elevates from -8° to 15° under manual control, turret traverses manually through 360°. A 7.62mm MG is mounted coaxial to left of main armament, plus a cupola with externally mounted 12.7mm M2 HB MG which can be aimed and fired from inside the vehicle.

Standard equipment includes central tyre pressure regulation system and run-flat tyres. A wide range of optional equipment includes different sights, laser rangefinder, fire detection and suppression system, fire-control system, power traverse and different engines, 190hp Mercedes-Benz diesel or 212hp Detroit Diesel.



#### VARIANTS

No variants except for models mentioned above.

#### STATUS

Production complete. In service with Bolivia, Brazil (Army and Marines), Burkina Faso, Chad, Chile, Colombia, Cyprus, Ecuador, Gabon, Ghana, Iran, Iraq, Libya, Nigeria, Paraguay, Surinam, Togo, Tunisia, Uruguay, Zimbabwe and other countries.

#### MANUFACTURER

ENGESA, Sao Jose dos Campos, Brazil. This company is no longer trading.



*Above left:  
ENGESA EE-9  
Cascavel*

*Above:  
ENGESA EE-9  
Cascavel*

*Left:  
ENGESA EE-9  
Cascavel with  
7.62mm A A  
MG*

# Cougar, Diesel Division, General Motors of Canada, Armoured Vehicle General Purpose (Canada)

## KEY RECOGNITION

### FEATURES

- Pointed hull front with nose sloping under hull to front wheel station, well sloped glacis plate leads up to horizontal hull top which extends to vertical hull rear with two doors. Turret mounted centre of hull roof
- Hull side welded mid-way up then slopes inwards at top and bottom, two firing ports with vision block above each over second and third road wheel station
- Three road wheels each side with distinct gap between first and second, propeller to immediate rear of third road wheel

## SPECIFICATIONS

|                        |                                                                         |
|------------------------|-------------------------------------------------------------------------|
| Crew:                  | 3+6                                                                     |
| Configuration:         | 6x6                                                                     |
| Armament:              | 1 x 12.7mm MG, 1 x 7.62mm MG (coaxial), 2 x 4 smoke grenade dischargers |
| Ammunition:            | 1,000 x 12.7mm, 4,400 x 7.62mm                                          |
| Length:                | 5.968m                                                                  |
| Width:                 | 2.53m                                                                   |
| Height overall:        | 2.53m                                                                   |
| Height hull top:       | 1.85m                                                                   |
| Ground clearance:      | 0.392m                                                                  |
| Wheelbase:             | 2.04m + 1.04m                                                           |
| Weight, combat:        | 10,500kg                                                                |
| Power-to-weight ratio: | 20.46hp/tonne                                                           |
| Engine:                | Detroit Diesel 6V-53T, 6-cylinder diesel developing 215hp               |
| Maximum road speed:    | 101.5km/hr                                                              |
| Maximum water speed:   | 7km/hr                                                                  |
| Maximum road range:    | 603km                                                                   |
| Fuel capacity:         | 204 lit                                                                 |
| Fording:               | Amphibious                                                              |
| Vertical obstacle:     | 0.381m to 0.508m                                                        |
| Trench:                | Not applicable                                                          |
| Gradient:              | 60%                                                                     |
| Side slope:            | 30%                                                                     |
| Armour:                | 10mm (maximum)                                                          |
| Armour type:           | Steel                                                                   |
| NBC system:            | None                                                                    |

Night vision equipment: Yes (passive for driver)

Note: Above relates to Wheeled Armoured Personnel Carrier Grizzly

## DEVELOPMENT

In 1974 the Canadian Armed Forces issued a requirement for an Armoured Vehicle General Purpose and after evaluating three prototype vehicles selected the Swiss MOWAG Piranha 6x6. Production was undertaken in Canada by Diesel Division, General Motors of Canada, first production vehicles completed in 1979. By the time production was completed in 1982, 491 had been built in three versions. More recently the Diesel Division, General Motors of Canada has built the Light Armored Vehicle (LAV) family of vehicles for Australia, Canada, the US Marine Corps and Saudi Arabia and the Bison (8x8) for the Canadian Armed Forces (qv).

Grizzly Wheeled Armoured Personnel Carrier (WAPC) has driver front left, commander to rear, engine compartment front right and turret in centre. Turret has one 12.7mm and one 7.62mm MG with manual traverse through 360° and elevation from -8° to 55°. Six infantrymen sit rear and enter and leave via two doors in hull rear. All three versions fully amphibious with two propellers, one each side at rear. Before entering the water a trim vane is erected at front and bilge pumps switched on.

## VARIANTS

Cougar 76mm Gun Wheeled Fire Support Vehicle (WFSV) is fitted with complete Alvis Scorpion turret with 76mm gun and 7.62mm coaxial MG. A total of 195 was built.



Husky Wheeled Maintenance and Recovery Vehicle, of which 27 were built, has roof-mounted hydraulic crane and crew of three.

All Canadian Armed Forces 6x6 vehicles are now fitted with the upgraded suspension fitted to the 8x8 vehicles which gives improved cross-country mobility.

#### **STATUS**

Production complete. In service with Canadian Armed Forces only.

#### **MANUFACTURER**

Diesel Division, General Motors of Canada Limited, London, Ontario, Canada.



*Top left: Canadian Army Cougar {Richard Stickland}*

*Above: Canadian Army Cougar (Richard Stickland)*

# NORINCO WZ 523 APC (China)

## KEY RECOGNITION FEATURES

- Long box-shaped hull similar to Belgian SIBMAS (6x6) APC, trim vane mounted on glacis plate, windscreen above covered by shutters hinged at top, horizontal hull top, vertical hull rear with single door opening to right
- Hull sides almost vertical, door in each side to rear of first road wheel, 12.7mm roof-mounted MG, roof hatches above rear troop compartment
- Three road wheels each side, second and third road wheels close together

## SPECIFICATIONS

|                        |                                              |
|------------------------|----------------------------------------------|
| Crew:                  | 2+10                                         |
| Configuration:         | 6x6                                          |
| Armament:              | 1 x 12.7mm MG                                |
| Ammunition:            | 600 x 12.7mm                                 |
| Length:                | 6.02m                                        |
| Width:                 | 2.55m                                        |
| Height with MG:        | 2.73m                                        |
| Weight, combat:        | 11,200kg                                     |
| Power-to-weight ratio: | 14.73hp/tonne                                |
| Engine:                | EQ 6105 water-cooled petrol developing 165hp |
| Maximum road speed:    | 80km/hr                                      |
| Maximum water speed:   | 7km/hr                                       |
| Maximum range:         | 600km                                        |
| Fuel capacity:         | 255 lit                                      |
| Fording:               | Amphibious                                   |
| Gradient:              | 60%                                          |
| Side slope:            | 30%                                          |

## DEVELOPMENT

During a parade in Beijing in October 1984 a new Chinese 6x6 APC was seen in public for the first time. It is very similar to the Belgian SIBMAS and South African Ratel (6x6) and is believed to have the Chinese designation WZ 523; US Army refers to it as M1984. It is fully amphibious, propelled by two waterjets mounted one each side of hull at rear. Main armament comprises roof-mounted 12.7mm Type 54 MG with lateral protection for gunner.

## VARIANTS

No known variants, but other models could include command post vehicle, ambulance, mortar carrier and anti-tank vehicle with missiles.

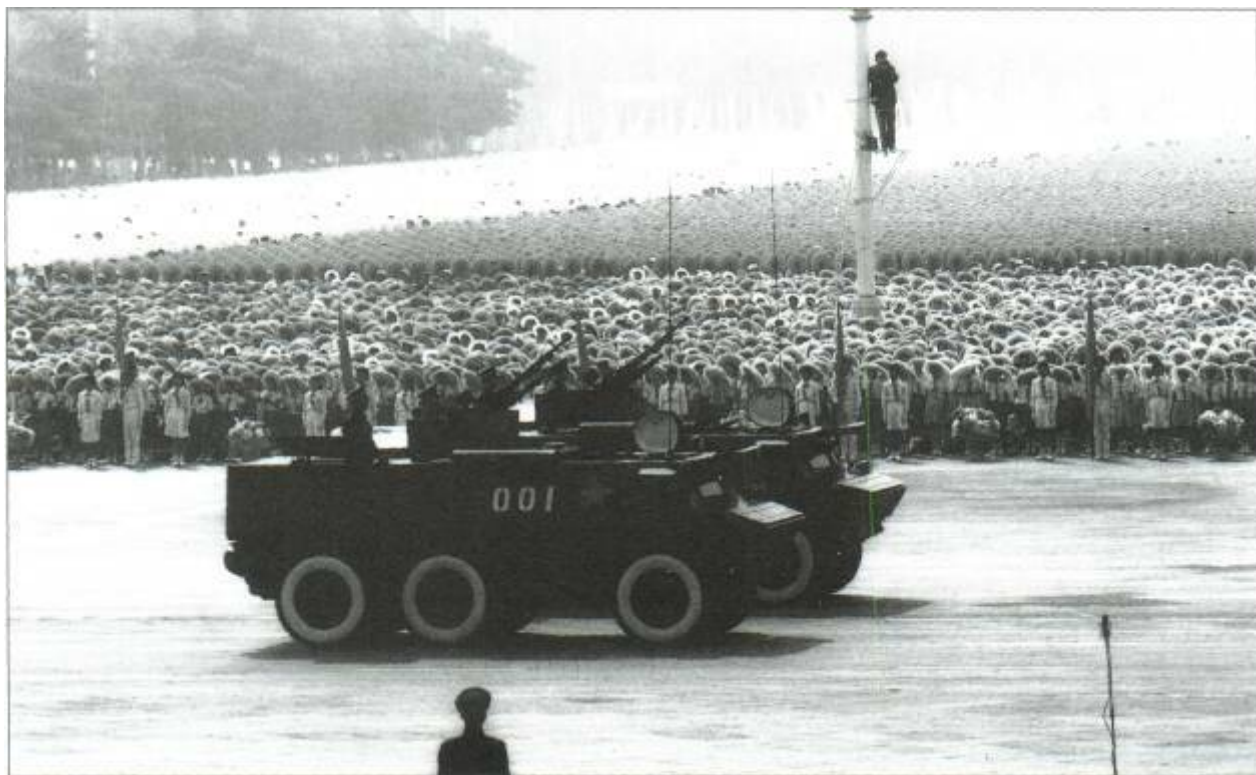
## STATUS

Production probably complete.

## MANUFACTURER

Chinese state arsenals.

*Right: Type WZ 523 (6x6) (via G Jacobs)*





# NORINCO WZ 551 APC (China)

## KEY RECOGNITION FEATURES

- Box type hull with nose sloping back under hull front, almost horizontal glacis plate leading to well sloped hull front with two large windows with flaps above. Horizontal hull roof and almost vertical hull rear with one large door
- Upper part of hull slopes inwards with firing ports in either side towards rear, exhaust pipe runs alongside upper part of left hull side. When armed, turret is normally on centre of hull roof
- Three large rubber tyred road wheels each side with shrouded propeller at rear each side

*Right:  
WZ 551 with 25mm  
turret*

## SPECIFICATIONS

|                         |                                                                 |
|-------------------------|-----------------------------------------------------------------|
| Crew:                   | 3 + 9                                                           |
| Configuration:          | 6 x 6                                                           |
| Armament:               | 1 x 25mm cannon, 1 x 7.62mm MG, 2 x 4 smoke grenade dischargers |
| Ammunition:             | 400 x 25mm, 1000 x 7.62mm                                       |
| Length:                 | 6.65m                                                           |
| Width:                  | 2.8m                                                            |
| Height:                 | 1.95m (hull top), 2.89m (turret top)                            |
| Ground clearance:       | 0.41m                                                           |
| Wheelbase:              | 1.9m + 1.9m                                                     |
| Weight, combat:         | 15,300kg                                                        |
| Weight, empty:          | 13,300kg                                                        |
| Power-to-weight ratio:  | 16.73hp/tonne                                                   |
| Engine:                 | Deutz BF8L413FV8 diesel developing 256 hjjt_2500r£m             |
| Maximum road speed:     | 85km/h                                                          |
| Maximum road range:     | 600km                                                           |
| Fuel capacity:          | 300l (estimate)                                                 |
| Fording:                | Amphibious                                                      |
| Vertical obstacle:      | 0.5m                                                            |
| Trench:                 | 1.2m                                                            |
| Gradient:               | 60%                                                             |
| Side slope:             | 30%                                                             |
| Armour:                 | 8mm (maximum) (estimate)                                        |
| Armour type:            | Steel                                                           |
| NBC system:             | Yes                                                             |
| Night vision equipment: | Yes                                                             |

## DEVELOPMENT

The NORINCO (Chinese North Industries Corporation) WZ 551 (6 x 6) APC is very similar in appearance to the French VAB (4x4

and 6x6) series which are covered in the previous entry and was first observed in the mid-1980s. Although the 6 x 6 version is the most common a quantity of 4 x 4 models have been built and there is also a projected 8 x 8 version.

The layout is similar to the VAB with the commander and driver at the front, engine compartment to rear of the driver and troop compartment extending to the rear. The latter has roof hatches, firing ports and a large door that opens to the right.

The specification relates to the model armed with a one man turret armed with a 25mm externally mounted cannon and a 7.62mm co-axial machine gun. Turret traverse is 360° with weapon elevation from -8° to +55°.

The WZ 551 is fully amphibious being propelled in the water by two shrouded propellers which are mounted one either side at the rear of the hull and standard equipment includes run-flat tyres and a fire detection and suppression system.

More recent production vehicles have more powerful engines and slightly different specifications.



#### VARIANTS

Ambulance, raised roof

Anti-tank (4 x 4) with Red Arrow 8 ATGW

ARC, armed with 12.7mm MG

IFV, turret armed with 25mm cannon and 7.62mm MG

IFV, turret of WZ 501 IFV (similar to Russian BMP-1)

NGV-1 IFV, fitted with Giat Industries Dragar turret 122mm

8 x 8 SPG, projected

SAM, with four fire and forget missiles

#### STATUS

In production. In service with Bosnia-Herzegovina and China.

#### MANUFACTURER

Chinese state factories.

*Above:  
WZ 551 with  
25mm turret*

*Above right  
WZ 551 with  
French  
Dragar  
turret*

*Right:  
WZ551  
without  
armament  
installed*



# Patria Vehicles XA-180 APC (Finland)

## KEY RECOGNITION FEATURES

- Hull sides and rear almost vertical with flat roof and pointed nose, trim vane on nose top
- Commander and driver at far front, each with side door, large windscreen covered by shutter hinged at top
- Three equally spaced road wheels each side, two doors in hull rear, shrouded propeller under each hull side at rear

## SPECIFICATIONS

|                         |                                                                       |
|-------------------------|-----------------------------------------------------------------------|
| Crew:                   | 2+10                                                                  |
| Configuration:          | 6x6                                                                   |
| Armament:               | 1 x 12.7mm MG, 1 x 4 smoke grenade dischargers                        |
| Ammunition:             | 1.000x 12.7mm (estimate)                                              |
| Length:                 | 7.35m                                                                 |
| Width:                  | 2.9m                                                                  |
| Height:                 | 2.3m                                                                  |
| Ground clearance:       | 0.4m                                                                  |
| Weight, combat:         | 15,500kg                                                              |
| Weight, empty:          | 12,500kg                                                              |
| Power-to-weight ratio:  | 15.22hp/tonne                                                         |
| Engine:                 | Valmet 6-cylinder, water-cooled, turbocharged diesel developing 236hp |
| Maximum road speed:     | 95km/hr                                                               |
| Maximum water speed:    | 10km/hr                                                               |
| Fuel capacity:          | 290 lit                                                               |
| Fording:                | Amphibious                                                            |
| Vertical obstacle:      | 0.6m                                                                  |
| Trench:                 | 1m                                                                    |
| Gradient:               | 70%                                                                   |
| Side slope:             | 60%                                                                   |
| Armour:                 | 10mm (maximum) (estimate)                                             |
| Armour type:            | Steel                                                                 |
| NBC system:             | Optional                                                              |
| Night vision equipment: | Optional                                                              |

## DEVELOPMENT

To replace Russian-supplied BTR-60PB (8x8) APCs in service with Finnish Army, SISU and Valmet each built prototypes of a

new 6x6 APC in 1982. Following extensive trials with both vehicles SISU XA-180 was selected in 1983 and is now in production and service with Finnish Army. XA-180 uses many automotive components of the SISU SA-150 VK (4x4) 6,500kg truck, also in service with Finnish Army.

Hull is all-welded armour with commander and driver front, engine compartment to rear of driver on left side and troop compartment rear. Troops sit five each side at rear on bench seats, and enter and leave via twin doors in hull rear, one of which has firing port and vision block. Two roof hatches over troop compartment and three vision blocks in each side with firing port beneath. Steering power-assisted on front two axles and vehicle fully amphibious, propelled by two propellers under hull rear. Before entering water a trim vane is erected at front of hull. Standard equipment includes front-mounted winch with 50m of 16mm cable and capacity of 10 tonnes, engine compartment fire suppression system. Armament normally comprises a roof-mounted 7.62mm or 12.7mm MG, the latter can be ring or turret mounted.

The XA-180 has now been followed in production by the improved XA-185 which has a more powerful engine.

Latest production model is the XA-200 which will be baseline for all future vehicles. SISU Defence is now Patria Vehicles.

## VARIANTS

Air defence, armed with Thomson-CSF Crotale New Generation SAM system, used by Finland only.

Radar, Finland has a number of vehicles with the Giraffe air surveillance radar.

AMOS 120mm mortar (prototype)

Other versions are believed to include command post with projected versions including anti-tank, mortar carrier,



ambulance and repair and recovery.

#### STATUS

In production. In service with Finland, Ireland, Netherlands, Norway and Sweden.

#### MANUFACTURER

Patria Vehicles, Hameenlinna, Finland.

*Above XA-181  
chassis with  
Crotale SAM*

*Above right:  
SISU XA-185  
(6x6)*

*Below right:  
SISU XA-185  
(6x6)*



# Panhard ERC 90 F4 Sagaie Armoured Car (France)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver's hatch in upper part which cannot be seen from side owing to large sheet metal covering, rear-opening side door between first and second wheel stations
- Turret centre of hull, long-barrelled 90mm gun with thermal sleeve and single baffle muzzle brake, two smoke grenade dischargers each side of turret towards rear
- Three road wheels each side with largest gap between first and second road wheel, sheet metal sides above rear road wheels ribbed horizontally

## SPECIFICATIONS

|                                  |                                                                                                 |
|----------------------------------|-------------------------------------------------------------------------------------------------|
| Crew:                            | 3                                                                                               |
| Configuration:                   | 6x6                                                                                             |
| Armament:                        | 1 x 90mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG AA (optional), 2 x 2 smoke grenade dischargers |
| Ammunition:                      | 20 x 90mm, 2,000 x 7.62mm                                                                       |
| Length gun forwards:             | 7.693m                                                                                          |
| Length hull:                     | 5.098m                                                                                          |
| Width:                           | 2.495m                                                                                          |
| Height:                          | 2.254m (overall), 1.502m (hull top)                                                             |
| Ground clearance:                | 0.294m (road), 0.344m (cross-country)                                                           |
| Wheelbase:                       | 1.63m + 1.22m                                                                                   |
| Weight, combat:                  | 8,300kg                                                                                         |
| Power-to-weight ratio:           | 17.5hp/tonne                                                                                    |
| Engine:                          | Peugeot V-6 petrol developing 155hp at 5,250rpm                                                 |
| Maximum road speed:              | 95km/hr                                                                                         |
| Maximum water speed (wheels):    | 4.5km/hr                                                                                        |
| Maximum water speed (hydrojets): | 9.5km/hr                                                                                        |
| Maximum road range:              | 700km                                                                                           |
| Fuel capacity:                   | 242 lit                                                                                         |
| Fording:                         | Amphibious                                                                                      |
| Vertical obstacle:               | 0.8m                                                                                            |
| Trench:                          | 1.1m                                                                                            |
| Gradient:                        | 60/o                                                                                            |
| Side slope:                      | 30%                                                                                             |
| Armour:                          | 10mm (maximum hull) (estimate)                                                                  |
| Armour type:                     | Steel                                                                                           |
| NBC system:                      | Optional                                                                                        |
| Night vision equipment:          | Optional (passive)                                                                              |

## DEVELOPMENT

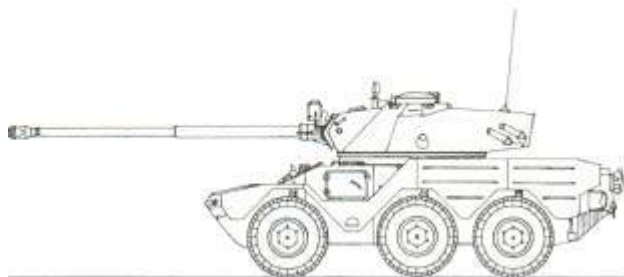
ERC (Engin de Reconnaissance Cannon) 6x6 armoured cars were developed as a private venture by Panhard from 1975, first production vehicles completed at its new Marolles factory in 1979. ERC shares many common component with the Panhard VCR 6x6 armoured personnel carriers developed at the same time. Although the ERC range was developed specifically for export it was adopted by the French Army, first vehicles delivered in 1984.

Drivers sits front, two-man turret centre, engine and transmission rear. GIATTS 90 turret is armed with 90mm gun that fires canister, HE, HE long-range, HEAT, smoke and APFSDS ammunition. Turret has manual traverse through 360°, manual elevation from -8° to +15°. This is usually referred to as the ERC-1 Sagaie.

Basic vehicle is fully amphibious, propelled by its wheels, although waterjets can be fitted if required. Steering is power-assisted on front two wheels. Centre road wheel each side is normally raised when travelling. A wide range of optional equipment is available including NBC system, night vision, land navigation, air-conditioning system/heater.

## VARIANTS

ERC 90 F4 Sagaie TTB 190 has SAMM 90mm TTB 190 turret. ERC 90 F4 Sagaie 2 is slightly larger with two engines. ERC 90 FI Lynx has Hispano-Suiza Lynx 90mm turret as on AML armoured car. This is usually referred to as the ERC-1 Lynx. ERC anti-aircraft, Gabon has model with turret armed with twin 20mm cannon.

**STATUS**

In production. In service with Argentina (Lynx 90), Chad (Lynx 90), France (ERC 90 F4 Sagaie), Gabon (Sagaie 2 TTB 190 and twin 20mm TAB 220 turret), Ivory Coast (ERC 90 F4 Sagaie), Mexico (Lynx) and Nigeria.

**MANUFACTURER**

Societe de Constructions Panhard et Levassor, Paris, France.



*Above: Panhard ERC 90 F4 Sagaie*

*Above right: Panhard ERC 90 F4 Sagaie*

*Right: Panhard ERC 90 f1 Lynx*

# GIAT AMX-10RC Reconnaissance Vehicle (France)

## KEY RECOGNITION FEATURES

- Pointed nose with trim vane folded back onto glacis plate, driver has half-circular cupola on left side of glacis, hull top to his rear horizontal, vertical hull rear
- Turret centre of hull, commander's cupola right and large periscopic sight to his front, 105mm gun with double baffle muzzle brake overhangs front of vehicle
- Three equally spaced road wheels each side which can be raised or lowered by driver. French Army vehicles have waterjet inlets to rear of last road wheels with outlet on hull rear

## SPECIFICATIONS

|                         |                                                                     |
|-------------------------|---------------------------------------------------------------------|
| Crew:                   | 4                                                                   |
| Configuration:          | 6x6                                                                 |
| Armament:               | 1 x 105mm, 1 x 7.62mm MG (coaxial), 2 x 2 smoke grenade dischargers |
| Ammunition:             | 38 x 105mm, 4,000 x 7.62mm                                          |
| Length gun forwards:    | 9.15m                                                               |
| Length hull:            | 6.357m                                                              |
| Width:                  | 2.95m                                                               |
| Height:                 | 2.66m (overall), 2.29m (turret top)                                 |
| Ground clearance:       | 0.35m (normal)                                                      |
| Wheelbase:              | 1.55m + 1.55m                                                       |
| Weight, combat:         | 15,880kg                                                            |
| Weight, empty:          | 14,900kg                                                            |
| Power-to-weight ratio:  | 16.45hp/tonne                                                       |
| Engine:                 | Baudouin Model 6F 11 SRX diesel developing 280hp at 3000rpm         |
| Maximum road speed:     | 85km/hr                                                             |
| Maximum water speed:    | 7.2km/hr                                                            |
| Maximum road range:     | 1,000km                                                             |
| Fuel capacity:          | Not available                                                       |
| Fording:                | Amphibious                                                          |
| Vertical obstacle:      | 0.8m                                                                |
| Trench:                 | 1.65m                                                               |
| Gradient:               | 50%                                                                 |
| Side slope:             | 30%                                                                 |
| Armour:                 | Classified                                                          |
| Armour type:            | Aluminium                                                           |
| NBC system:             | Yes                                                                 |
| Night vision equipment: | Yes (passive for commander, gunner and driver)                      |

## DEVELOPMENT

AMX-10RC was developed by the AMX to meet a French Army requirement to replace the Panhard EBR (8x8) armoured car. First prototype was completed in 1971, first production vehicles completed in 1978 and final deliveries made to French Army in 1987. The Moroccan vehicles are not fitted with a waterjet propulsion system.

Layout is conventional with driver front left, three-man turret centre, loader left, commander and gunner right, engine and transmission rear. The 105mm gun is mounted in a turret which traverses 360°, gun elevates from -8° to +20°. Computerised fire-control system includes laser rangefinder and LLLTV system for both commander and gunner. The 105mm gun fires HEAT, HE and practice rounds with an APFSDS round introduced in 1987.

AMX-10RC is fully amphibious, propelled by two waterjets. The driver can adjust suspension to suit terrain.

## VARIANTS

AMX-10RC driver training vehicle.

French Army AMX-10RC vehicles are to be upgraded in a number of key areas including installation of a 105mm gun that can fire NATO types of ammunition, thermal camera, decoy system, additional armour, central tyre pressure regulation system, electronic control system for the transmission and a Land Battlefield Management System. For financial reasons not all of these upgrades are now expected to be implemented.

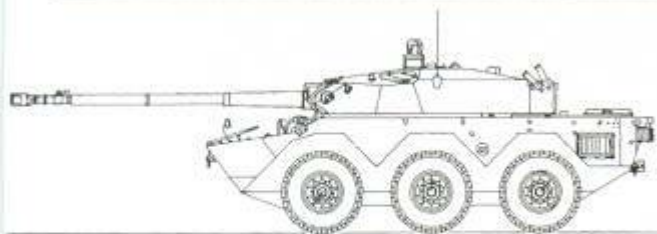
## STATUS

Production complete. In service with France, Morocco and Qatar.

## MANUFACTURER

GIAT Industries, Roanne, France.





*Above: AMX-10RC (6x6)*

*Right: AMX-10RC (6x6)*

*Below: AMX-10RC (6x6)*



# Renault VBC 90 Armoured Car (France)

## KEY RECOGNITION FEATURES

- Very high hull with sloping glacis plate, driver sits front left, three bullet-proof windows, horizontal hull top, turret centre, vertical hull rear
- Three very large road wheels each side with equal spaces between, louvres on left side of hull at rear
- Turret has long-barrelled 90mm gun with single baffle muzzle brake and thermal sleeve that overhangs front of vehicle

## SPECIFICATIONS

|                         |                                                                                                                        |
|-------------------------|------------------------------------------------------------------------------------------------------------------------|
| Crew:                   | 3                                                                                                                      |
| Configuration:          | 6x6                                                                                                                    |
| Armament:               | 1 x 90mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft) (optional), 2 x 2 smoke grenade dischargers           |
| Ammunition:             | 45 x 90mm, 4000 x 7.62mm                                                                                               |
| Length gun forwards:    | 8.085m                                                                                                                 |
| Length hull:            | 5.63m                                                                                                                  |
| Width:                  | 2.5m                                                                                                                   |
| Height:                 | 2.552m (turret top), 1.737m (hull top)                                                                                 |
| Ground clearance:       | 0.4m (axle), 0.5m (hull)                                                                                               |
| Wheelbase:              | 1.5m + 1.5m                                                                                                            |
| Weight, combat:         | 13,500kg                                                                                                               |
| Power-to-weight ratio:  | 16bhp/tonne                                                                                                            |
| Engine:                 | Renault MIDS 06.20.45 in-line water-cooled turbocharged diesel developing 220hp at 2,300rpm (or MAN developing 220bhp) |
| Maximum road speed:     | 92km/hr                                                                                                                |
| Maximum road range:     | 1,000km                                                                                                                |
| Fording:                | 1.2m                                                                                                                   |
| Vertical obstacle:      | 0.5m                                                                                                                   |
| Trench:                 | UT                                                                                                                     |
| Gradient:               | 50%                                                                                                                    |
| Side slope:             | 30%                                                                                                                    |
| Armour:                 | Classified                                                                                                             |
| Armour type:            | Steel                                                                                                                  |
| NBC system:             | Optional                                                                                                               |
| Night vision equipment: | Optional                                                                                                               |

Renault VBC 90 (6x6)



## DEVELOPMENT

VBC 90 (Vehicule Blinde de Combat) was designed by Renault Vehicules Industriels for export and has many automotive components of the VAB 4x4 and 6x6 APCs such as engine, transmission and suspension. The first prototype was completed in 1979, first production vehicles following in 1981. The French Gendarmerie took delivery of the first of 28 VBC 90s in 1983; these have a SOPTAC 11 fire-control system incorporating a laser rangefinder.

Driver sits front left, two-man turret centre, engine and transmission rear. The GIAT TS-90 turret is also installed on the Panhard ERC 90 F4 Sagaie (6x6) and has a 90mm gun with 7.62mm MG mounted coaxial to left with optional 7.62mm anti-aircraft MG on turret roof. Turret traverse is powered through 360°, manual elevation from -8° to +15°.

Standard equipment includes front-mounted winch with capacity of 6,000kg, heater, and wide range of optional equipment including NBC system, different fire-control systems and night vision devices.

**VARIANTS**

There were many variants of the Renault VBC 90 (6x6) armoured car but apart from the standard production model with the GIAT Industries TS-90 turret, none of these ever went into production or service.

**STATUS**

Production complete. No longer being marketed. In service with France and Oman.

**MANUFACTURER**

Renault Vehicules Industriels/Creusot-Loire Industrie, Saint Chamond, France.



**Right: Renault VBC 90** (6x6)

# Panhard VCR APC (France)

## KEY RECOGNITION FEATURES

- Glacis plate at about 45° with driver's hatch in upper part, step up to hull roof which extends to vertical hull rear with large door opening right
- Commander's cupola rear of driver on left side, engine compartment right, main armament on forward part of roof and secondary armament on rear. Rear troop compartment has two upward-opening flaps in each side
- Three road wheels each side, second wheel normally raised while travelling on roads. Hull sides vertical except for rear troop compartment which slopes inwards mid-way up

## SPECIFICATIONS

|                         |                                                    |
|-------------------------|----------------------------------------------------|
| Crew:                   | 3 + 9                                              |
| Configuration:          | 6x6                                                |
| Armament:               | Depends on role                                    |
| Ammunition:             | Depends on role                                    |
| Length:                 | 4.875m                                             |
| Width:                  | 2.5m                                               |
| Height with 7.62mm MG:  | 2.56m                                              |
| Height hull top:        | 2.13m                                              |
| Ground clearance:       | 0.315m (4 wheels), 0.37m (6 wheels)                |
| Wheelbase:              | 1.66m + 1.425m                                     |
| Power-to-weight ratio:  | 18.35hp/tonne                                      |
| Engine:                 | Peugeot PRVV-6 petrol developing 145hp at 5,500rpm |
| Maximum road speed:     | 90km/hr                                            |
| Maximum water speed:    | 4km/hr                                             |
| Maximum road range:     | 700km                                              |
| Fuel capacity:          | 242 lit                                            |
| Fording:                | Amphibious                                         |
| Vertical obstacle:      | 0.8m                                               |
| Trench:                 | 1.1m                                               |
| Gradient:               | 60%                                                |
| Side slope:             | 30%                                                |
| Armour:                 | 12mm (maximum)                                     |
| Armour type:            | Steel                                              |
| NBC system:             | Optional                                           |
| Night vision equipment: | Optional (passive)                                 |

## DEVELOPMENT

VCR (Vehicule de Combat a Roues) was developed as a private venture by Panhard and shares many automotive components



**Panhard VCR (6x6) APC with 12.7mm MG**

with Panhard ERC range of 6x6 armoured cars. VCR was first shown in 1977 and entered production in 1979. Largest order to date is 100 VCT/TH anti-tank vehicles for Iraq. Panhard has also built prototypes of the improved VCR TT 2 (6x6) APC but this has yet to enter production.

VCR is fully amphibious, propelled by its wheels. Standard equipment includes run-flat tyres, optional equipment includes front-mounted winch, air-conditioning system, NBC system and passive night vision equipment. Wide range of weapon stations including turret-mounted 12.7mm MG at front and ring-mounted 7.62mm MG at rear. Other options include turret with 60mm breech-loaded mortar, turret- or ring-mounted 20mm cannon, turret with MILAN ATGWs in ready-to-launch position.

**VARIANTS**

VCR/AT repair vehicle has block and tackle at rear, tools and spare parts.

VCR/AA anti-aircraft vehicle has Bofors Missiles RBS-70 SAM, prototype only.

VCR/TH anti-tank vehicle has Euromissile UTM-800 turret with four HOT ATGW in ready-to-launch position, GIAT Mascot 7.62mm remote-controlled MG rear.

VCR/IS ambulance has higher roof and medical equipment.

VCR/PC command post vehicle has extensive communications equipment. Also variant in electronic warfare role.

VCR/TT (4x4) is essentially 6x6 with centre wheel removed each side and replaced by waterjet. Used only by Argentina.

**STATUS**

Production as required. In service with Argentina (4x4), Iraq (6x6), Mexico (6x6) and United Arab Emirates (6x6).

**MANUFACTURER**

Societe de Constructions Mecaniques Panhard and Levassor, Paris, France.



*Above: Panhard VCR/IS (6x6) ambulance*



# GIAT VAB APC (France)

## KEY RECOGNITION FEATURES

- Box-type hull with nose sloping back under hull front, almost horizontal glacis plate leading to well sloped hull front with two windows, horizontal roof and almost vertical hull rear with two large opening rear doors
- Upper part of hull sides slope inwards, single door with window in each side of forward part of hull, three upward-opening shutters in each side at rear, exhaust pipe on right side of hull
- Two large rubber-tyred road wheels each side in 4x4 model, also 6x6 version with three equally spaced road wheels each side, waterjets sometimes mounted under hull at rear. Light armament normally mounted over front right of vehicle.

## SPECIFICATIONS (4X4)

|                         |                                                                                                         |
|-------------------------|---------------------------------------------------------------------------------------------------------|
| Crew:                   | 2+10                                                                                                    |
| Configuration:          | 4x4                                                                                                     |
| Armament:               | 1 x 12.7mm MG (typical)                                                                                 |
| Length:                 | 5.98m                                                                                                   |
| Width:                  | 2.49m                                                                                                   |
| Height (hull top):      | 2.06m                                                                                                   |
| Ground clearance:       | (axles) 0.4m, (hull) 0.5m                                                                               |
| Wheelbase:              | 3m                                                                                                      |
| Weight, combat:         | 13,000kg                                                                                                |
| Weight, empty:          | 10,200ka                                                                                                |
| Power-to-weight ratio:  | '16.92hp/tonne                                                                                          |
| Engine:                 | Renault MDS 06.20.45 six-cylinder in-line water-cooled turbocharged diesel developing 220hp at 2,200rpm |
| Maximum road speed:     | 92km/hr                                                                                                 |
| Maximum water speed:    | 7km/hr                                                                                                  |
| Maximum road range:     | 1,000km                                                                                                 |
| Fuel capacity:          | 300 lit                                                                                                 |
| Fording:                | Amphibious                                                                                              |
| Vertical obstacle:      | 0.5m                                                                                                    |
| Trench:                 | Not applicable                                                                                          |
| Gradient:               | 60%                                                                                                     |
| Side slope:             | 35%                                                                                                     |
| Armour:                 | Classified                                                                                              |
| Armour type:            | Steel                                                                                                   |
| NBC system:             | Yes                                                                                                     |
| Night vision equipment: | Yes (passive for driver)                                                                                |

## DEVELOPMENT

Prototypes of both 4x4 and 6x6 versions were built by Renault and Panhard to meet requirements of French Army for a

Forward Area Armoured Vehicle (Vehicule de l'Avant Blinde). The 4x4 configuration was selected with first production vehicles completed at Saint Chamond in 1976. By 1999 over 5,000 had been built for French Army (4x4) and for export (6x6 and 4x4). Production and marketing of the VAB family is now carried out by Giat Industries.

All versions have a similar layout with driver front left, commander/machine gunner right, engine compartment rear of driver, small passageway on right and troop compartment rear with seats down each side, roof hatches, two doors at rear and three hatches in each side. Fully amphibious, propelled by its wheels or by waterjets mounted at rear of hull. Before entering water a trim vane is erected at front.

## VARIANTS

Variants are numerous and include infantry combat vehicle (with various turrets mounting 25mm or 20mm cannon), VAB Echelon (repair vehicle), VCAC HOT anti-tank vehicle with Mephisto system with four HOT missiles, VCAC HOT anti-tank vehicle with UTM 800 turret with four HOT missiles, VAB PC (command vehicle), VAB Transmission (communications vehicle), VAB engineer vehicle, electronic warfare carrier (Bromure), VAB Sanitaire (ambulance), VMO (internal security vehicle), VTM 120 (mortar towing vehicle with 120mm mortar), VPM 81 (81mm mortar in rear), anti-aircraft (2 x 20mm cannon, used by Oman), NBC reconnaissance, recovery, TOW ATGW and anti-aircraft with Matra Mistral SAMs. VAB components also used in VBC-90 (6x6) armoured car (qv).

The latest model is the Improved VAB and it is expected that all future production vehicles will be to this standard.

**STATUS**

Production as required. In service with Brunei, Central African Republic, Cyprus, France, Indonesia, Ivory Coast, Lebanon, Mauritius, Morocco, Oman, Qatar, United Arab Emirates and other undisclosed countries.

**MANUFACTURER**

Giat Industries, France



*Above: VAB Sanitaire (4x4) ambulance  
(Richard Stickland)*

*Left: VAB (6x6) with turret armed with 20mm  
cannon and 7.62mm MG*



# Henschel Wehrtechnik Transportpanzer 1 (Fuchs) APC (Germany)

## KEY RECOGNITION FEATURES

- Long box-shaped hull with pointed front, trim vane retracted onto glacis plate above which is large one-piece window covered by armoured shutter hinged at top, forward-opening door each side at hull front
- Flat horizontal roof with two circular hatches over front of vehicle, three hatches over rear troop compartment, twin doors at rear
- Three large road wheels each side with hull above sloping inwards. Six forward-firing smoke grenade dischargers and exhaust pipe on left side of hull

## SPECIFICATIONS

|                         |                                                                                   |
|-------------------------|-----------------------------------------------------------------------------------|
| Crew:                   | 2+10                                                                              |
| Configuration:          | 6x6                                                                               |
| Armament:               | 1 x 7.62mm MG, 1 x 6 smoke grenade dischargers                                    |
| Ammunition:             | 1,000x 7.62mm (estimate)                                                          |
| Length:                 | 6.3m                                                                              |
| Width:                  | 2.98m                                                                             |
| Height:                 | 2.30(T)Jhull_tOE)                                                                 |
| Ground clearance:       | 0.506m (hull), 0.406m (axle)                                                      |
| Wheelbase:              | 1.75m + 2.05m                                                                     |
| Weight, combat:         | 19,000kd                                                                          |
| Weight, empty:          | 14,400kg                                                                          |
| Power-to-weight ratio:  | 16.84hp/tonne                                                                     |
| Engine:                 | Mercedes-Benz Model OM 402A V-8 liquid-cooled diesel developing 320hp at 2,500rpm |
| Maximum road speed:     | 105km/hr                                                                          |
| Maximum water speed:    | 10.5km/hr                                                                         |
| Maximum road range:     | 800km                                                                             |
| Fuel capacity:          | 390 lit                                                                           |
| Fording:                | Amphibious                                                                        |
| Vertical obstacle:      | 0.6m                                                                              |
| Trench:                 | 1.1m                                                                              |
| Gradient:               | 70%                                                                               |
| Side slope:             | 35%                                                                               |
| Armour:                 | Classified                                                                        |
| Armour type:            | Steel                                                                             |
| NBC system:             | Yes                                                                               |
| Night vision equipment: | Yes (driver has passive periscope)                                                |

## DEVELOPMENT

After building numerous prototypes of 4x4 and 6x6 amphibious armoured load carriers, the 6x6 was placed in production as Transportpanzer 1 (Fuchs) with 996 delivered to the German Army between 1979 and 1986.

Since then production has been resumed for the NBC reconnaissance vehicle which has been adopted by the US Army as the M93. During the Middle East conflict of 1991, Germany supplied these vehicles to Israel, United Kingdom and the United States.

Commander and driver sit at far front, engine compartment to their immediate rear on left side, small passageway on right side. Troop compartment extends right to rear, troops enter and leave via twin doors in rear. Transportpanzer is fully amphibious, two propellers mounted on each side under hull rear. Standard equipment includes NBC system, power-assisted steering on front two axles, engine compartment fire extinguishing system. Normal armament for German Army vehicles is 7.62mm MG above hull front on right side.

## VARIANTS

Models in service with Germany Army:  
 RASIT radar carrier with radar retracted into hull for travelling.  
 Command and communications vehicle with extensive communications equipment.  
 NBC reconnaissance vehicle.  
 Engineer vehicle carrying demolitions.  
 Electronic warfare, TPz 1 Eloka.  
 Supply carrier.  
 EOD vehicle, developed to prototype stage.  
 Transportpanzer 1 could be adopted for a wide range of roles including ambulance, mortar vehicle (81mm or 120mm), ATGW



carrier, ambulance, cargo carrier, recovery or maintenance vehicle and infantry fighting vehicle with various types of weapon stations and firing ports/vision blocks.

Fuchs KRK, latest upgrade version for German Army with increased payload and improved armour.

Venezuela has taken delivery of 10 Transportpanzer 1s with one 12.7mm MG and one 7.62mm MG on roof. Prototype of an 8x8 Transportpanzer has been built.

#### **STATUS**

Production. In service with Germany, Israel, Saudi Arabia, The Netherlands, Turkey, United Kingdom, United States and Venezuela.

#### **MANUFACTURER**

Henschel Wehrtechnik, Kassel, Germany.

*Above: Transportpanzer 1 (6x6)*

*Above left: NBC reconnaissance Tpz 1 in NBC role (Michael Jerchel)*

# RN-94 APC (International)

## KEY RECOGNITION FEATURES

- Box-shaped hull with nose sloping back under front of vehicle, glacis slopes up to horizontal hull top on which various turrets and cupolas can be fitted. Drivers and commanders hatches are at front of vehicle roof
- Hull line is above road wheels with upper part of hull sides sloping inwards with wider gap between second and third road wheel than first and second
- Hull rear is pointed with two doors, the upper part opening to the outside and the lower part folding down to form a step

## SPECIFICATIONS

|                         |                                                                            |
|-------------------------|----------------------------------------------------------------------------|
| Crew:                   | 2 + 11                                                                     |
| Armament:               | 1 x 25 mm cannon, 1 x 7.62 mm MG (co-axial), 2 x 3 smoke grenade launchers |
| Ammunition:             | 220 x 200 mm and 200 x 7.62 mm (ready use)                                 |
| Length:                 | 6.715m                                                                     |
| Width:                  | 2.8m                                                                       |
| Height overall:         | 2.74m                                                                      |
| Ground clearance:       | 0.43 m                                                                     |
| Weight, combat:         | 13,000kg                                                                   |
| Weight, empty:          | 11,000kg                                                                   |
| Power-to-weight ratio:  | 18.46 hp/tonne                                                             |
| Ground pressure:        | n/available                                                                |
| Engine:                 | Cummins CTA 8.3-10 diesel developing 240 hp at 2400 rpm                    |
| Maximum road speed:     | 110km/h                                                                    |
| Maximum road range:     | 500 km                                                                     |
| Fuel capacity:          | n/available                                                                |
| Fording:                | amphibious                                                                 |
| Vertical obstacle:      | 0.50 m                                                                     |
| Trench:                 | 1.1 m                                                                      |
| Gradient:               | 60°/o                                                                      |
| Side slope:             | 30%                                                                        |
| Armour:                 | Classified                                                                 |
| Armour type:            | Steel                                                                      |
| NBC system:             | Optional                                                                   |
| Night vision equipment: | Optional                                                                   |

## DEVELOPMENT

The RN-94 (6 x ) APC has been developed by the Turkish

company of Nurol Machinery and Industry Co Inc and S N Romarm SA Finiala S C Moreni based in Romania. The Turkish Land Forces Command has placed an order for five pre-production vehicles, all of which have been delivered.

The driver and commander are seated at the front of the vehicle with the driver on the left and the commander on the right. The powerpack is to the rear of the driver on the left side with an aisle connecting the front of the vehicle with the troop compartment at the rear. The latter is provided with roof hatches and twin doors in the rear.

A wide range of weapon stations can be fitted onto the turret roof including the French Giat Industries Drager turret armed with a 25 mm cannon and 7.62 mm co-axial machine gun. This turret has powered traverse through a full 360 degrees with weapon elevation from -10 to +50 degrees. If required a stabilisation system can also be fitted to allow the armament to be aimed and fired while the vehicle is moving across country.

Steering is power assisted on the front four wheels and standard equipment includes a central tyre pressure regulation system that allows the driver to adjust the tyre pressure to suit the ground being crossed.

It is fully amphibious being propelled in the water by two waterjets mounted one either side under the hull rear. A wide range of optional equipment is available including NBC system and passive night vision equipment.

## VARIANTS

Apart from the different weapon systems, there are no specialised versions of the RN-94 so far although the vehicle can be adopted for a wide range of specialised roles such as command post, ambulance and mortar carrier.



# **STATUS**

Pre-production batch delivered to the Turkish Army.

# **MANUFACTURER**

See text

*Above: RN-94 with Dragar turret  
(Christopher F Foss)*

*Top right: RN-94 with Dragar turret  
(Christopher F Foss)*

*Right: RN-94 with Dragar turret  
(Christopher F Foss)*



# Komatsu Type 87 Reconnaissance and Patrol Vehicle (Japan)

## KEY RECOGNITION FEATURES

- Box-shaped hull with flat nose, well sloped glacis plate with driver's position on right side, horizontal hull top, vertical rear with engine on right side
- Turret in centre of hull has eight sides, all of which are vertical, 25mm cannon in forward part with 7.62mm coaxial MG to right
- Three large equally spaced road wheels each side with forward-opening door in left side between second and third road wheels

## SPECIFICATIONS

|                         |                                                                           |
|-------------------------|---------------------------------------------------------------------------|
| Crew:                   | 5                                                                         |
| Configuration:          | 6x6                                                                       |
| Armament:               | 1 x 25mm cannon, 1 x 7.62mm MG (coaxial), 2 x 3 smoke grenade dischargers |
| Length:                 | 5.99m                                                                     |
| Width:                  | 2.48m                                                                     |
| Height:                 | 2.8m                                                                      |
| Ground clearance:       | 0.45m                                                                     |
| Wheelbase:              | 1.5m + 1.5m                                                               |
| Weight, combat:         | 15,000kg                                                                  |
| Power-to-weight ratio:  | 20.33hp/tonne                                                             |
| Engine:                 | Isuzu 10PBI water-cooled diesel developing 305hp at 2,700rpm              |
| Maximum road speed:     | 100km/hr                                                                  |
| Maximum road range:     | 500km                                                                     |
| Fuel capacity:          | Not available                                                             |
| Fording:                | 1m                                                                        |
| Vertical obstacle:      | 0.6m                                                                      |
| Trench:                 | 1.5m                                                                      |
| Gradient:               | 60%                                                                       |
| Side slope:             | 30%                                                                       |
| Armour:                 | Classified                                                                |
| Armour type:            | Aluminium                                                                 |
| NBC system:             | None                                                                      |
| Night vision equipment: | Yes                                                                       |

## DEVELOPMENT

Type 87 has been developed to meet the requirements of the Japanese Ground Self Defence Force by Komatsu and shares many automotive components with the Type 82 Command and Communications Vehicle developed by Mitsubishi Heavy Industries. It is believed that the total requirements is for 250 vehicles.

Driver sits front right with radio operator to his left, two-man turret centre, engine rear on right side, observer facing rear on left side.

Two-man power-operated turret sits commander on right and gunner on left and has Oerlikon Contraves 25mm KBA cannon with 7.62mm Type 74 MG mounted coaxial to left. Type 87 has no amphibious capability.

## VARIANTS

No variants.

## STATUS

Production. In service with Japanese Ground Self Defence Force.

## MANUFACTURER

Komatsu Limited, Minato-Ku, Japan.



*Above: Type 87  
Reconnaissance and  
Patrol Vehicle (Paul  
Beaver)*

*Above right: Type 87  
Reconnaissance and  
Patrol Vehicle  
(Kensuke Ebata)*

*Right: Type 87  
Reconnaissance and  
Patrol Vehicle  
(Kensuke Ebata)*



# Mitsubishi Type 82 Command and Communications Vehicle (Japan)

| KEY RECOGNITION FEATURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | SPECIFICATIONS           |                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Three closely spaced large road wheels each side with hull line above road wheels</li> <li>• Snub nose with glacis plate sloping up towards windscreen that extends across front of vehicle with smaller windows to sides, all of which can be covered by hatch covers hinged top; 7.62mm MG above forward hull</li> <li>• Front two-thirds of hull roof horizontal, then slopes upwards at an angle for remaining third on which 12.7mm MG is mounted, large door in hull rear opens to right</li> </ul> | Crew:                    | 8                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Configuration:           | 6x6                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Armament:                | 1 x 12.7mm MG, 1 x 7.62mm MG                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Length:                  | 5.72m                                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Width:                   | 2.48m                                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Height without armament: | 2.37m                                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ground clearance:        | 0.45m                                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Wheelbase:               | 1.5m + 1.5m                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Weight, combat:          | 13,500kg                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Weight, empty:           | 12,000kg                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Power-to-weight ratio:   | 22.4hp/tonne                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Engine:                  | Isuzu 10PBI water-cooled diesel developing 305hp at 2,700rpm |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Maximum road speed:      | 100km/hr                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Maximum range:           | 500km                                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Fuel capacity:           | Not available                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Fording:                 | 1m                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Vertical obstacle:       | 0.6m                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Trench:                  | 1.5m                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Gradient:                | 60%                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Side slope:              | 30%                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Armour:                  | Classified                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Armour type:             | Steel (not confirmed)                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | NBC system:              | None                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Night vision equipment:  | Yes (driver)                                                 |

## DEVELOPMENT

In the early 1970s the Japanese Ground Self Defence Force issued a requirement for a new wheeled reconnaissance vehicle and, following trials with both 4x4s and 6x6s, the latter was selected for further development. This was subsequently standardised as Type 82 command and communications vehicle, the first ten approved in the 1982 defence budget. Under current plans it is expected that 250 vehicles will be supplied to the Japanese Ground Self Defence Force.

Driver sits front right, another crew member on left (who also mans pintle-mounted 7.62mm MG above his position). Engine compartment is towards hull front on left side with passageway to rear crew compartment on right.

Remainder of crew sit on individual seats at rear and enter via a large door in hull rear; there is also a door between the second and third road wheels on the left side and between the first and second road wheels on the right side. All doors have vision port which can also be used as firing port. There are extra two vision ports on the right side and one on the left. The 12.7mm M2 HB MG has a shield and is mounted on the forward right part of the rear crew compartment roof, commander's cupola on the left.

More recently some vehicles have been fitted with a new roof-mounted cupola armed with 12.7mm MG that can be aimed and fired from within the vehicle.

## VARIANTS

NBSC reconnaissance vehicle. Automotive components of Type 82 are also used in the Type 87 reconnaissance and patrol vehicles (qv).



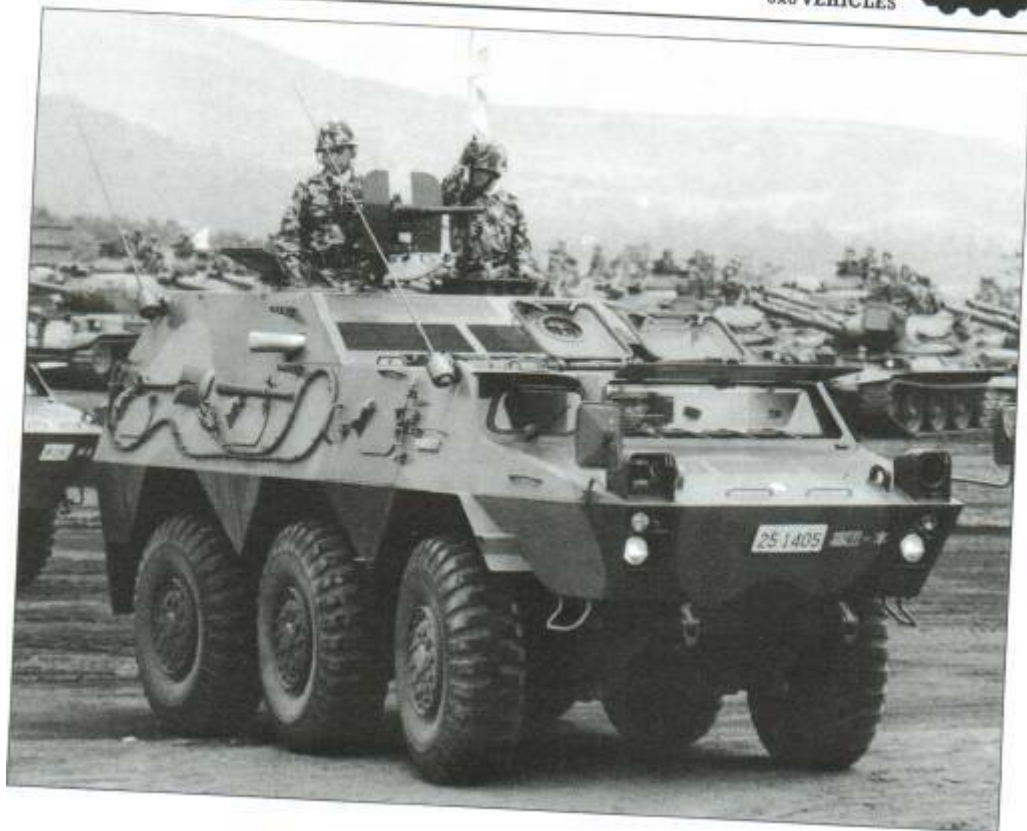
**STATUS**

In production. In service with the Japanese Ground Self Defence Force.

**MANUFACTURER**

Mitsubishi Heavy Industries, Tokyo, Japan.

*Right: Type 82 with roof mounted cupola with 12.7mm MG (Kensuke Ebata)*



# BTR-152 APC (Russia)

## KEY RECOGNITION

### FEATURES

- 6x6 chassis with rear wheels mounted close together, sides and rear of troop compartment vertical, with corners sloping inwards
- Engine front with open-topped troop compartment rear, firing ports each side, single door each side to rear of engine compartment, twin doors rear with spare wheel and tyre
- Nose of BTR-152 has armoured louvres for engine cooling

## SPECIFICATIONS (BTR-152V1)

|                         |                                                                             |
|-------------------------|-----------------------------------------------------------------------------|
| Crew:                   | 2+17                                                                        |
| Configuration:          | 6x6                                                                         |
| Armament:               | 1 x 7.62mm MG                                                               |
| Ammunition:             | 1,250 x 7.62mm                                                              |
| Length:                 | 6.55m                                                                       |
| Width:                  | 2.32m                                                                       |
| Height:                 | 2.36m (without armament)                                                    |
| Ground clearance:       | 0.295m                                                                      |
| Wheelbase:              | 3.3m + 1.13m                                                                |
| Weight, combat:         | 8,950kg                                                                     |
| Power-to-weight ratio:  | 12.29hp/tonne                                                               |
| Engine:                 | ZIL-123 6-cylinder in-line water-cooled petrol developing 110hp at 3,000rpm |
| Maximum road speed:     | 75km/hr                                                                     |
| Road range:             | 600km                                                                       |
| Fuel capacity:          | 300 lit                                                                     |
| Fording:                | 0.8m                                                                        |
| Vertical obstacle:      | 0.6m                                                                        |
| Trench:                 | 0.69m                                                                       |
| Gradient:               | 55%                                                                         |
| Side slope:             | 30%                                                                         |
| Armour:                 | 4mm to 13.5mm                                                               |
| Armour type:            | Steel                                                                       |
| NBC system:             | None                                                                        |
| Night vision equipment: | Yes (driver only, infra-red, on BTR-152V3)                                  |

## DEVELOPMENT

BTR-152 was developed after the Second World War, basically a much modified truck chassis with armoured body. First

production vehicles completed in 1950 but it was replaced many years ago in the Soviet Army by BTR-60P series 8x8 APCs.

Commander and driver sit to rear of fully enclosed engine compartment at front, open-topped troop compartment to rear. Around top of troop compartment are three sockets for mounting 7.62mm or 12.7mm MGs. Some vehicles have front-mounted winch with capacity of 5,000kg.

Late production vehicles have the central tyre pressure regulation system that allows the driver to adjust tyre pressure to suit terrain being crossed.

## VARIANTS

BTR-152, first model, no winch or tyre pressure system.

BTR-152V has external central tyre pressure regulation system, command version is BTR-1521.

BTR-152V1 has front-mounted winch and central tyre pressure regulation system with external air lines.

BTR-152V2 has central tyre pressure regulation system with external air lines, no winch.

BTR-152V3 has front-mounted winch, infra-red driving lights, central tyre pressure regulation system with internal air lines.

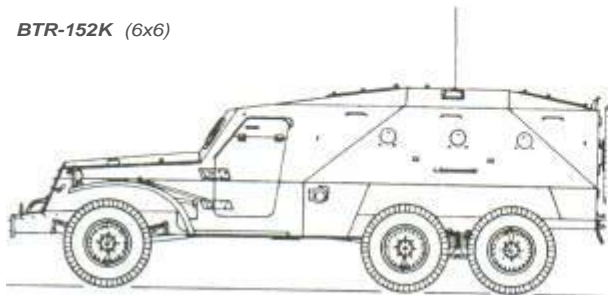
BTR-152K, same as BTR-152V3 but with full overhead armour protection for troop compartment.

BTR-152U command vehicle with much higher roof for command staff to stand upright, often tows trailer with generator.

BTR-152A anti-aircraft vehicle with turret armed with twin 14.5mm MGs, also fitted in BTR-40P.

BTR-152 with 23mm ZU-23 LAAG, some of which were captured by Israel in Lebanon, summer 1982.

BTR-152 with 12.7mm MGs. Egypt used BTR-152s with former Czechoslovak Quad 12.7mm M53 turret in rear.

*BTR-152K (6x6)***STATUS**

Production complete. In service with Afghanistan, Angola, Cambodia, Central African Republic, Congo, Cuba, Ethiopia, Guinea, Guinea-Bissau, Iraq, North Korea, Laos, Mali, Mongolia, Mozambique, Namibia, Nicaragua, Sri Lanka, Sudan, Syria, Tanzania, Yemen and Vietnam.

**MANUFACTURER**

Former Soviet state factories.

*Right: BTR-152V1 (6x6) ARC (Michael Jerchel)*

*Above Right: BTR-152K (6x6) APC*



# Al-Faris AF-40-8-1 APC (Saudi Arabia)

## KEY RECOGNITION FEATURES

- Large box shaped hull with nose sloping back under front of vehicle and with glacis plate sloping up to horizontal hull top. Commanders and drivers hatch are in upper part of glacis plate and open upwards
- Four road wheels each side with larger gap between second and third road wheels, upper part of hull slopes inwards
- Various weapon stations can be fitted on roof and over rear troop compartment rear are two roof hatches. Hull rear slopes slightly inwards with large ramp

## SPECIFICATIONS

|                           |                                                      |
|---------------------------|------------------------------------------------------|
| Crew:                     | 1 + 11                                               |
| Armament:                 | Depends on role                                      |
| Ammunition:               | Depends on role                                      |
| Length hull:              | 7.90m                                                |
| Width:                    | 2.94m                                                |
| Height:                   | 2.36m (see text)                                     |
| Ground clearance:         | 0.405m (see text)                                    |
| Weight, combat:           | 19,500kg                                             |
| Weight, empty:            | 16,000kg                                             |
| Power-to-weight ratio:    | 20.51 hp/tonne                                       |
| Ground pressure:          | Not available                                        |
| Engine:                   | Deutz 10-cylinder air cooled diesel developing 400hp |
| Maximum road speed:       | 90km/h                                               |
| Maximum road range:       | 800km                                                |
| Fuel capacity:            | 550l                                                 |
| Fording with preparation: | Amphibious                                           |
| Vertical obstacle:        | 1.525m                                               |
| Trench:                   | 2.50m                                                |
| Gradient:                 | 80%                                                  |
| Side slope:               | 55%                                                  |
| Armour:                   | Classified                                           |
| Armour type:              | Steel                                                |
| NBC system:               | Yes                                                  |
| Night vision equipment:   | Optional                                             |

## DEVELOPMENT

The Al-Faris 8 - 400 8x8 armoured vehicle has been developed by the Abdallah Al-Faris Et Company for Heavy Industries in two versions, the AF-40-8-1 armoured personnel carrier and the AF-40-8-2 armoured car.

The main difference between these two vehicles is that the power pack for the APC model is in the centre of the hull while for the armoured car it is at the rear. The first version to enter production is the armoured personnel carrier version.

The commander and driver are seated at the front with the powerpack to their immediate rear. There is no access between the front of the vehicle and the troop compartment at the rear. Access to the latter is via two small roof hatches or the large power operated ramp in the hull rear.

An unusual feature of the Al-Faris is that the suspension is fully adjustable, not only up and down but left and right. The ground clearance can be adjusted from 150mm to 600mm. Steering is power assisted on all wheels and standard equipment includes an NBC system and an air conditioning system.

Optional equipment includes central tyre pressure regulation equipment, firing ports, winch, night vision equipment and fire detection and suppression system.

A wide range of turrets and weapons can be fitted including Delco turret armed with 25mm cannon, 7.62mm machine gun and TOW ATGWs, 120mm Armoured Mortar Turret, anti-tank with 106mm recoilless rifle and various pintles fitted with 7.62mm or 12.7mm machine guns.

## VARIANTS

In addition to being fitted with various weapon stations the vehicle can be modified for a wide range of roles such as command post and ambulance. The armoured car version can be fitted with a wide range of weapons stations up a turret armed with a 105mm gun.



# **STATUS**

Production. In service with Saudi Arabia.

# **MANUFACTURER**

Abdallah Al-Faris Company for Heavy Industries, Saudi Arabia.

*Above: AF-40-8-1 APC without armament  
(Terry J Gander)*

*Top right: AF-40-8-1 APC with 25mm turret  
(Christopher F Foss)*

*Right: AF-40-1 APC with 120mm mortar  
turret (Christopher F Foss)*



# Reumech OMC Ratel 20

## Infantry Fighting Vehicle (South Africa)

### KEY RECOGNITION FEATURES

- Long box-shaped hull, driver front, large windows to his front and sides, horizontal roof and vertical rear with engine on left rear side, entry door on right rear side
- Circular turret with raised cupola for commander on left side of roof to rear of driver, externally mounted 7.62mm anti-aircraft MG on roof at right rear
- Three large road wheels, forward-opening door to rear of first road wheel, four firing ports and vision blocks in each side, two rear wheels close together

### SPECIFICATIONS

|                        |                                                                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Crew:                  | 4+7                                                                                                                                           |
| Configuration:         | 6x6                                                                                                                                           |
| Armament:              | 1 x 20mm cannon, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 1 x 7.62mm MG (anti-aircraft, rear), 2 x 2 smoke grenade dischargers |
| Ammunition:            | 1,200 x 20mm, 6,000 x 7.62mm                                                                                                                  |
| Length of hull:        | 7.212m                                                                                                                                        |
| Width:                 | 2.516m                                                                                                                                        |
| Height overall:        | 2.915m                                                                                                                                        |
| Height hull top:       | 2.105m                                                                                                                                        |
| Ground clearance:      | 0.34m                                                                                                                                         |
| Wheelbase:             | 2.809m + 1.4m                                                                                                                                 |
| Weight, combat:        | 18,500ky                                                                                                                                      |
| Weight, empty:         | 16,500kg                                                                                                                                      |
| Power-to-weight ratio: | 15.24hp/tonne                                                                                                                                 |
| Engine:                | D 3256 BTXF 6-cylinder in-line turbocharged diesel developing 282hp at 2,200rpm                                                               |
| Maximum road speed:    | 105km/hr                                                                                                                                      |
| Maximum road range:    | 1,0001km                                                                                                                                      |
| Fuel capacity:         | 430 lit                                                                                                                                       |
| Fording:               | 1.2m                                                                                                                                          |
| Vertical obstacle:     | 0.6m                                                                                                                                          |
| Trench:                | 1.15m                                                                                                                                         |
| Gradient:              | 60%                                                                                                                                           |
| Side slope:            | 30Q/0                                                                                                                                         |

Armour: 20mm (maximum)

Armour type: Steel

Night vision equipment: Optional

### DEVELOPMENT

Ratel range of 6x6s was developed to meet the requirements of South African Army, first prototype completed in 1974 and first production vehicles in 1979. Production continued until early 1987 with about 1,200 built in three marks (1, 2 and 3) for both home and export.

Driver sits front with three large bullet-proof windows for observation to front and sides; windows can be covered by armoured shutters hinged at bottom.

Mounted on roof to rear of driver is manual turret with commander left and gunner right, turret traverse 360°, 20mm cannon and /62mm coaxial MG elevating from -8° to +38°, second 7.62mm MG on turret roof for air defence.

Seven infantrymen sit centre of vehicle with firing ports, vision blocks and roof hatches. Engine compartment is left rear with passageway, 7.62mm anti-aircraft MG mounted above on the right side.

### VARIANTS

Ratel 60 IFV has crew of 11 and two-man turret armed with 60mm mortar, 7.62mm coaxial and 7.62mm anti-aircraft MG, second 7.62mm anti-aircraft MG at right rear.

Ratel 90 FSV (fire support vehicle) has 10-man crew and similar turret to Eland 90 (4x4) armoured car's with 90mm gun, 7.62mm coaxial and 7.62mm anti-aircraft MG right rear.



Ratel 12.7mm command has nine-man crew and two-man turret with 12.7mm MG, 7.62mm anti-aircraft MG and second 7.62mm anti-aircraft MG right rear.

Ratel repair, basic Ratel fitted with a front mounted jib for carrying out repairs in the field.

Ratel 81mm mortar has no turret and 81mm turntable mounted mortar firing through roof hatches.

Ratel anti-tank, fitted with new turret armed with three Swift laser guided ATGWs in ready-to-launch position and 7.62mm machine gun. In service with South African Armoured Corps.

Artillery observation vehicle with mast mounted sensor pod

#### STATUS

Production complete. In service with Morocco and South Africa.

#### MANUFACTURER

Reumech Reumech OMC, Benoni, South Africa.



**Above: Ratel 20 (6x6) IFV**

**Top left: Ratel (6x6) with turret for launching Swift ATGWs (Christopher F Foss)**

**Right: Ratel 90 (6x6) FSV**





# SANTA BARBARA BMR-600 IFV (Spain)

| KEY RECOGNITION FEATURES                                                                                           | SPECIFICATIONS          |                                                                      |
|--------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------|
| • Long box-shaped hull with pointed front and driver's compartment offset to left side                             | Crew:                   | 2+11                                                                 |
|                                                                                                                    | Configuration:          | 6x6                                                                  |
|                                                                                                                    | Armament:               | 1 x 12.7mm MG                                                        |
|                                                                                                                    | Ammunition:             | 2,500 x 12.7mm                                                       |
| • Three large road wheels each side with equal gap between, hull line above wheel arches                           | Length:                 | 6.15m                                                                |
|                                                                                                                    | Width:                  | 2.5m                                                                 |
|                                                                                                                    | Height:                 | 2.36m (including armament), 2m (hull top)                            |
|                                                                                                                    | Ground clearance:       | 0.4m                                                                 |
| slopes slightly inwards, exhaust pipe right side of hull, power operated ramp at rear                              | Wheelbase:              | 1.65m + 1.65m                                                        |
|                                                                                                                    | Weight, combat:         | 14,000kg                                                             |
|                                                                                                                    | Power-to-weight ratio:  | 22hp/tonne                                                           |
|                                                                                                                    | Engine:                 | Pegaso 9157/8 6-cylinder in-line diesel developing 310hp at 2,200rpm |
| • Basic Spanish Army BMR-600 has cupola with externally mounted 12.7mm MG on hull top to rear of driver's position | Maximum road speed:     | 103km/hr                                                             |
|                                                                                                                    | Maximum water speed:    | 9km/hr                                                               |
|                                                                                                                    | Maximum range:          | 1,000km                                                              |
|                                                                                                                    | Fuel capacity:          | 400 lit                                                              |
|                                                                                                                    | Fording:                | Amphibious                                                           |
|                                                                                                                    | Vertical obstacle:      | 0.6m                                                                 |
|                                                                                                                    | Trench:                 | 1.35m                                                                |
|                                                                                                                    | Gradient:               | 60%                                                                  |
|                                                                                                                    | Side slope:             | 30%                                                                  |
|                                                                                                                    | Armour:                 | 38mm (maximum) (estimate)                                            |
|                                                                                                                    | Armour type:            | Aluminium                                                            |
|                                                                                                                    | NBC system:             | Optional                                                             |
|                                                                                                                    | Night vision equipment: | Optional                                                             |

## DEVELOPMENT

BMR-600 (Blindado Medio de Ruedas) was designed by the Spanish Army and Pegaso, first prototype completed in 1975

and first production vehicles delivered in 1979. It shares many components with the VEC (see ACRVs). Company designation for BMR-600 was BMR 3560.50.

Driver sits front left, MG cupola to his immediate rear, engine compartment to right, troop compartment extends to rear and has roof hatches and ramp at rear.

BMR-600 is fully amphibious, propelled by waterjets one each side at rear of hull. Standard equipment includes power steering, engine compartment fire extinguishing system, run-flat tyres and winch. Optional equipment includes different tyres, communications equipment, firing ports/vision blocks, night driving equipment and air-conditioning system.

Spanish Army BMR-600s have cupola with externally mounted 12.7mm M2 HB MG which can be aimed and fired from inside. Wide range of weapon stations available including turret-mounted 20mm cannon.

Spanish Army BMR-600 vehicles are being fitted with a Scania DS9 diesel developing 310hp at 2,200rpm.

## VARIANTS

Command vehicle (3560.51)

Radio communications vehicle (3560.56).

Missile launcher (eg HOT) (3560.57).

81mm mortar carrier (3560.53E).

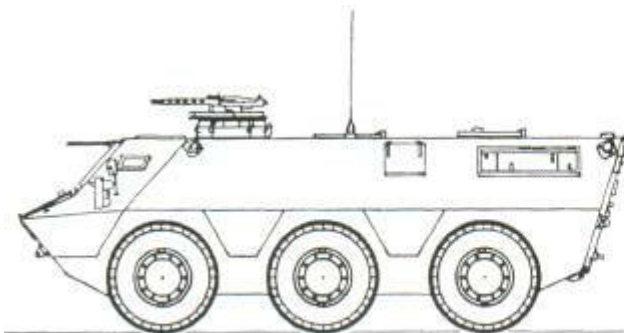
Combat vehicle with heavier armament such as 90mm gun (3564, for export only).

Ambulance (3560.54).

Recovery and maintenance vehicle (3560.55).

Towing 120mm mortar.

There is also a version with the 120mm mortar mounted in the rear of the vehicle, this is designated the 3560.59E.



#### STATUS

Production as required. In service with Egypt, Peru, Saudi Arabia and Spain.

#### MANUFACTURER

SANTA BARBARA, Madrid, Spain.

*Above: BMR-600 with 7.62mm MG*

*Above right: BMR-600 with 12.7mm MG as used by Spanish Army (Pierre Touzin)*

*Right: BMR-600 towing 120mm mortar*



# SANTA BARBARA VEC Cavalry Scout Vehicle (Spain)

## KEY RECOGNITION

### FEATURES

- High hull with well sloped glacis plate with central driver's position, horizontal hull top with sloping back
- Turret centre of hull with slightly sloping front and sides, distinct chamfer between turret front and sides
- Three equally spaced road wheels each side with hull above road wheels sloping inwards

## SPECIFICATIONS

Crew:

Configuration:

6x6

Armament:

1 x 25mm, 1 x 7.62mm MG (coaxial),  
2 x 3 smoke grenade dischargers

Ammunition:

170 x 25mm (turret),  
250 x 7.62mm (turret)

Length:

6.1m

Width:

2.5m

Height:

2.51m (turret roof), 2.00m (hull top)

Ground clearance:

0.4m

Wheelbase:

1.65m + 1.65m

Weight, combat:

13,750kg

Power-to-weight ratio: 22.25hp/tonne

Engine:

Pegaso Model 9157/8 6-cylinder in-line turbocharged diesel developing 310hp at 2,200rpm (being replaced by a Scania DS9 diesel developing 310hp at 2,20rpm)

Maximum road speed: 103km/hr

Maximum water speed (wheels): 3km/hr (waterjets): 9km/hr

Maximum road range: 800km

Fuel capacity:

400 lit

Fording:

Amphibious

Vertical obstacle:

0.6m

Trench:

1.5m

Gradient:

60%

Side slope:

30%

Armour:

Classified

Armour type:

Aluminium

NBC system^

Optional

Night vision equipment:

Optional

## DEVELOPMENT

VEC (Vehículo de Exploración de Caballería) was developed by Pegaso to meet the requirements of the Spanish Army and uses many common components of the BMR-600 (6x6) infantry fighting vehicle. First five prototypes were completed in 1977/78, with a total Spanish Army requirement for 235 vehicles. (VEC is also known as Pegaso VEC 3562.) Driver sits front centre, two-man turret centre (Italian OTOBREDA T25 made under licence in Spain), engine to turret rear on left side. Fourth crew man sits turret rear on right side, fifth crew man to his front.

The T25 turret has full powered traverse through 360°, elevation powered from -10° to +50°, and 7.62mm MG mounted above.

The Spanish designation for the T25 turret is the CETME TC-15/M242. The 25mm cannon is the US M242 Bushmaster from The Boeing Company and is also installed in the Bradley M2/M3 used by the US Army.

VEC is fully amphibious, propelled by its wheels; waterjets are an optional extra. Steering is power-assisted on front and rear axles, suspension is adjustable.

Optional equipment includes NBC system, night vision equipment, winch with capacity of 4,500kg, fire extinguishing system, larger tyres and land navigation system.

## VARIANTS

VEC for the export market has a wide range of other turrets to meet different mission requirements, such as anti-tank missile, air-defence (gun or missile), or French Hispano-Suiza 90mm turret as fitted to Panhard AML armoured car. Spanish Army has some vehicles fitted with 20mm turret and 90mm turret (from AML).

**STATUS**

Production complete. In service with the Spanish Army.

**MANUFACTURER**

SANTA BARBARA, Madrid, Spain.

*Right: VEC (6x6) fitted with 25mm TC25 turret*



# Alvis Saracen APC (UK)

## KEY RECOGNITION FEATURES

- Engine compartment far front, horizontal radiator louvres which extend to rear of first road wheel station, raised troop compartment to rear, hull sides sloping slightly inwards
- Troop compartment has three rectangular firing ports in each side, two outward-opening doors in hull rear which each have rectangular firing port
- Three large equally spaced road wheels each side, MG turret on hull roof centre and 7.62mm MG on ring mount to immediate rear

## SPECIFICATIONS

|                         |                                                                               |
|-------------------------|-------------------------------------------------------------------------------|
| Crew:                   | 2+10                                                                          |
| Configuration:          | 6x6                                                                           |
| Armament:               | 1 x 7.62mm MG (turret), 1 x 7.62mm MG (ring), 2 x 3 smoke grenade dischargers |
| Ammunition:             | 3,000 x 7.62mm                                                                |
| Length:                 | 5.233m                                                                        |
| Width:                  | 2.539m                                                                        |
| Height:                 | 2.463m (turret top), 2m (hull top)                                            |
| Ground clearance:       | 0.432m                                                                        |
| Wheelbase:              | 1.524m + 1.524m                                                               |
| Weight, combat:         | 10,170kg                                                                      |
| Weight, empty:          | 8,640kg                                                                       |
| Power-to-weight ratio:  | 15.73hp/tonne                                                                 |
| Engine:                 | Rolls-Royce B80 Mk 6A 8-cylinder petrol developing 160hp at 3,750rpm          |
| Maximum road speed:     | 72km/hr                                                                       |
| Maximum range:          | 100km                                                                         |
| Fuel capacity:          | 200 lit                                                                       |
| Fording:                | 1.07m, 1.98m with preparation                                                 |
| Vertical obstacle:      | 0.46m                                                                         |
| Trench:                 | 1.52m                                                                         |
| Gradient:               | 42%                                                                           |
| Side slope:             | 30%                                                                           |
| Armour:                 | 16mm (maximum)                                                                |
| Armour type:            | Steel                                                                         |
| NBC system:             | None                                                                          |
| Night vision equipment: | None                                                                          |

## DEVELOPMENT

Alvis Saracen APC (FV603) was developed shortly after the

Second World War and shares many components with Alvis Saladin (6x6) armoured car. First prototype completed in 1952, 1,838 vehicles being built by the time production was completed in 1972. The Saracen APC was finally phased out of service with the British Army in 1993 and these have all now been disposed of.

Driver sits front of crew compartment, section commander to his left rear, radio operator right rear, four troops on each side facing. Turret has manual traverse through 360° and 7.62mm MG elevates from -12° to +45°. A 7.62mm Bren LMG is normally mounted to rear of turret for anti-aircraft role.

## VARIANTS

Saracen with reverse-flow cooling has different front and top engine covers.

FV604 Saracen command vehicle is similar to FV603 but can have tent erected to rear of hull.

FV610 command vehicle has much higher roof and no MG turret.

FV611 is ambulance with same hull as above.

Alvis Vehicles Limited now offer an upgrade for the FV600 series, including the Saracen which includes the installation of a Perkins Phaser 180 MTi 180hp diesel engine. This is known to have been adopted by Indonesia.

## STATUS

Production complete. In service with Indonesia, Jordan, Lebanon, Lebaon, Mauritania, Nigeria, South Africa (for sale) and Sri Lanka.

## MANUFACTURER

Alvis Vehicles Limited, Telford, Shropshire, UK.

**Right: Alvis Saracen**  
16x6 (MoD)



# Hotspur Hussar APC (UK)

## KEY RECOGNITION FEATURES

- Vertical hull front with horizontal louvres, spare wheel on top, commander's and driver's windscreen slopes to rear with shutters hinged above, horizontal hull top extends to rear
- Forward-opening door in each side to immediate front of second road wheel station, three firing ports with vision block above in each side of troop compartment which slopes inwards top and bottom
- Twin doors in rear each with firing port and vision block, three road wheels each side, one front and two close together at rear

## SPECIFICATIONS

|                            |                                                            |
|----------------------------|------------------------------------------------------------|
| Crew:                      | 1+13                                                       |
| Configuration:             | 6x6                                                        |
| Armament:                  | Optional                                                   |
| <u>Length:</u>             | 5.74m                                                      |
| Width:                     | 1.85m                                                      |
|                            | 2.62m                                                      |
| Height hull roof:          | 2.10m                                                      |
| Ground clearance:          | 0.21m                                                      |
| Wheelbase:                 | 3.81m                                                      |
| Weight, combat:            | 5,350kg                                                    |
| Power-to-weight ratio:     | 25hp/tonne                                                 |
| Engine:                    | Rover V-8 water-cooled petrol developing 134hp at 4,000rpm |
| <u>Maximum road speed:</u> | 120km/hr                                                   |
| <u>Maximum range:</u>      | 300km                                                      |
| Fuel capacity:             | 98 lit                                                     |
| Armour:                    | 8mm (maximum] (estimate)                                   |
| <u>Armour type:</u>        | Steel                                                      |
| <u>NBC system:</u>         | None                                                       |
|                            | Optional for driver I                                      |

## DEVELOPMENT

Hussar was developed as a private venture by Hotspur Armoured Products and shown for the first time in 1984. Two prototypes were built followed by 25 production vehicles for two undisclosed countries. Since then additional orders have been placed.

Hussar is a modified Land Rover One Ten chassis with fully armoured body for complete protection from small arms fire



**Above: Hotspur Hussar (6x6) with MG turret (Christopher F Foss)**

and shell splinters. Engine is front, driver and commander to immediate rear, troop compartment extending to back of vehicle. Twelve troops sit six each side on bench seats facing. Standard equipment includes a full air-conditioning system.

Optional equipment includes turret on roof with single or twin 7.62mm MGs, winch, night vision equipment, 24V electrical system, smoke/grenade launchers, powered steering, diesel engine, spot lamps, siren, long-range fuel tanks and run-flat tyres.

## VARIANTS

Hussar can be used for a number of roles including ambulance and command post vehicle.

Other armoured vehicles designed and built by Hotspur Armoured Products include Borderer (4x4) scout car (prototypes only), Sandringham (6x6) APC (in service with Finland, Sri Lanka



and a Gulf state), 4984 (4x4) vehicle based on Land Rover chassis, Poliseac ARC based on 6x6 Land Rover chassis and Skirmisher 4585 (4x4) ARC.

#### STATUS

Production as required. In service with Bahrain (police), Egypt and at least two other undisclosed countries.

#### MANUFACTURER

Hotspur Armoured Products, a Division of Penman Engineering Limited, Heathall, Dumfries, Scotland, UK.



*Right: Hotspur Sandringham (6x6)*

# AlvisSaladinArmouredCar(UK)

## KEY RECOGNITION FEATURES

- Driver front, well sloped glacis plate, turret centre, engine rear. Engine has six rectangular covers on top, upper part of hull rear vertical, lower part sloping back under hull, cylindrical silencer on right side at rear
- Three equally spaced road wheels identical to those of Alvis Saracen ARC
- Turret has flat sides and vertical rear with short-barrelled 76mm gun in external mantlet, 7.62mm MG on right side of roof, cable drum on turret rear

## SPECIFICATIONS

|                                      |                                                                                                       |
|--------------------------------------|-------------------------------------------------------------------------------------------------------|
| Crew:                                | 3                                                                                                     |
| Configuration:                       | 6x6                                                                                                   |
| Armament:                            | 1 x 76mm gun, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 2 x 6 smoke grenade dischargers |
| Ammunition:                          | 42 x 76mm, 2,750 x 7.62mm                                                                             |
| Length gun forward:                  | 5.284m                                                                                                |
| Length hull:                         | 4.93m                                                                                                 |
| Width:                               | 2.54m                                                                                                 |
| Height to top of gunner's periscope: | 2.39m                                                                                                 |
| Height to turret top:                | 2.19m                                                                                                 |
| Ground clearance:                    | 0.426m                                                                                                |
| Wheelbase:                           | 1.524m + 1.524m                                                                                       |
| Weight, combat:                      | 11,590kg                                                                                              |
| Weight, empty:                       | 10,500kg                                                                                              |
| Power-to-weight ratio:               | 14.66hp/tonne                                                                                         |
| Engine:                              | Rolls-Royce B80 Mk 6A 8-cylinder petrol developing 170bhp at 3,750rpm                                 |
| Maximum road speed:                  | 72km/hr                                                                                               |
| Range:                               | 400km                                                                                                 |
| Fuel capacity:                       | 241 lit                                                                                               |
| Fording:                             | 1.07m                                                                                                 |
| Vertical obstacle:                   | 0.46m                                                                                                 |
| Trench:                              | 1.52m                                                                                                 |
| Gradient:                            | 46%                                                                                                   |
| Side slope:                          | 30%                                                                                                   |
| Armour:                              | 8-32mm                                                                                                |
| Armour type:                         | Steel                                                                                                 |

NBC system: None

Night vision equipment: None

## DEVELOPMENT

Saladin (FV601) (6x6) armoured car was developed by Alvis of Coventry (now moved to Telford) for the British Army and shares many components with Alvis Saracen (6x6) armoured personnel carrier. 1,177 vehicles were produced between 1959 and 1972. Has been replaced in British Army by Alvis Scorpion CVR(T).

Main armament comprises 76mm gun with 7.62mm machine gun mounted coaxial to right and similar weapon on right side of turret roof. Turret traverse is powered through 360° with weapon elevation from -10° to +20°. Gun fires same ammunition as 76mm gun on Alvis Scorpion, although actual gun is different.

## VARIANTS

No variants. Saladin turret has been fitted to some Australian M113A1 series APCs for fire support role but these now in reserve.

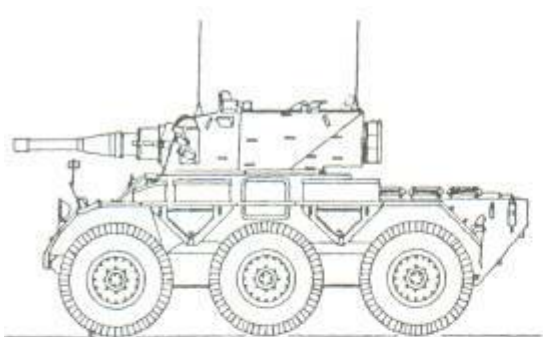
Alvis have developed an upgrade kit for the Saladin which includes the replacement of the petrol engine by a more fuel-efficient Perkins diesel. This has been sold to Indonesia.

## STATUS

Production complete. In service with Bahrain, Honduras, Indonesia, Jordan, Lebanon, Mauritania, Portugal, Sri Lanka, Sudan, Tunisia, United Arab Emirates.

## MANUFACTURER

Alvis Vehicles Limited, Telford, England, UK.



*Top left: Alvis Saladin*

*Above: Alvis Saladin*

*Left: Alvis Saladin  
(MoD)*



# Cadillac Gage LAV-300 AFV Range(USA)

## KEY RECOGNITION FEATURES

- Long box-type hull with pointed front, horizontal hull top and vertical rear. Weapon station normally on hull top in line with second road wheel
- Three large road wheels each side with distinctive gap between first and second,, hull sides above road wheels slope inwards
- Twin doors at rear each with firing port and vision block above, small door in left side of hull to rear of first wheel station, firing ports with vision block above in hull sides

## SPECIFICATIONS

|                         |                                                                                                   |
|-------------------------|---------------------------------------------------------------------------------------------------|
| Crew:                   | 3+9                                                                                               |
| Configuration:          | 6x6                                                                                               |
| Armament:               | 1 x 90mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 2 x 6 smoke grenade dischargers |
| Length:                 | 6.4m                                                                                              |
| Width:                  | 2.54m                                                                                             |
| Height:                 | 2.7m (turret roof), 1.98m (hull top)                                                              |
| Ground clearance:       | 0.533m (hull), 0.381m (axle)                                                                      |
| Wheelbase:              | 2.209m + 1.524m                                                                                   |
| Weight, combat:         | 14,696kg                                                                                          |
| Power-to-weight ratio:  | 18.94bhp/tonne                                                                                    |
| Engine:                 | Cummins 6 CTA 8.3 turbocharged, 6-cylinder in-line diesel developing 276hp at 1,900rpm            |
| Maximum road speed:     | 105km/hr                                                                                          |
| Maximum water speed:    | 3km/hr                                                                                            |
| Maximum range:          | 925km                                                                                             |
| Fuel capacity:          | 435 lit                                                                                           |
| Fording:                | Amphibious                                                                                        |
| Vertical obstacle:      | 0.609m                                                                                            |
| Trench:                 | Not applicable                                                                                    |
| Gradient:               | 60%                                                                                               |
| Side slope:             | :H/V 0                                                                                            |
| Armour:                 | Classified                                                                                        |
| Armour type:            | Steel                                                                                             |
| NBC system:             | Optional                                                                                          |
| Night vision equipment: | Optional                                                                                          |

## DEVELOPMENT

LAV-300 range of 6x6s was developed by Cadillac Gage as a private venture to complement its 4x4s. First prototypes completed in 1979, first production vehicles in 1982.

Driver sits front left, engine compartment to his right, troop compartment extending right to rear. Troops enter and leave via twin doors in hull rear, roof hatches also provided. LAV-300 is fully amphibious, propelled by its wheels. Standard equipment includes front-mounted winch with capacity of 9,072kg. Wide range of optional equipment includes air-conditioning system and heater.

Cadillac Gage vehicles are manufactured by Textron Marine ft Land Systems.

## VARIANTS

LAV-300 can be fitted with wide range of turrets including one-man turret with twin 7.62mm or one 7.62mm and one 12.7mm MGs, ring mount with 7.62mm or 12.7mm MG, one- or two-man turret with 20mm cannon and 7.62mm MG, two-man turret with 25mm cannon and 7.62mm coaxial MG, two-man turret with 76mm or 90mm gun, 7.62mm coaxial and 7.62mm AAMG.

More specialised versions include TOW anti-tank, ambulance, 81mm mortar, recovery, cargo carrier, command post vehicle, and air defence vehicle (gun or missile), some of which have raised roof to rear of driver's position. The 81 mm mortar carrier, for example, has the standard hull with hatches that open either side to enable mortar to be used.

## STATUS

Production as required. Sales have been made to Kuwait, Panama and the Philippines.

## MANUFACTURER

Textron Marine ft Land  
Systems, New Orleans,  
Louisiana, USA.

*Right: LAV-300  
with one man  
turret armed with  
20mm cannon and  
7.62mm machine  
gun*

6x6 VEHICLES





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# **8x8 VEHICLES**

# Diesel Division, General Motors of Canada, Bison APC (Canada)

## KEY RECOGNITION FEATURES

- Long hull with nose sloping back under front to first road wheel station, well sloped glacis plate leading to horizontal roof, above second/third road wheel roof is raised and extends to rear of vehicle. Hull rear is vertical with ramp that contains a door
- Four road wheels either side with slightly larger gap between second and third road wheels, upper part of hull slopes inwards on front half of vehicle, rear half almost vertical with extensive external stowage
- Raised commander's cupola in line with second road wheel on left side of hull, 7.62mm MG on ring type mount

## SPECIFICATIONS

|                         |                                                                                  |
|-------------------------|----------------------------------------------------------------------------------|
| Crew:                   | 2+9                                                                              |
| Configuration:          | 8x8                                                                              |
| Armament:               | 1 x 7.62mm MG, 2 x 4 smoke grenade dischargers                                   |
| Ammunition:             | 2,000 x 7.62mm (estimate)                                                        |
| Length:                 | 6.452m                                                                           |
| Width:                  | 2.5m                                                                             |
| Height:                 | 2.21m                                                                            |
| Weight, combat:         | 12,936kg                                                                         |
| Weight, empty:          | 11,072kg                                                                         |
| Power-to-weight ratio:  | 21.25hp/tonne                                                                    |
| Engine:                 | Detroit Diesel Model 6V-53T<br>6-cylinder diesel developing<br>275hp at 2,800rpm |
| Maximum road speed:     | 100km/hr                                                                         |
| Maximum water speed:    | 9.7km/hr                                                                         |
| Maximum range:          | 665km                                                                            |
| Fuel capacity:          | Not available                                                                    |
| Fording:                | Amphibious                                                                       |
| Vertical obstacle:      | 0.381 to 0.508m                                                                  |
| Trench:                 | 2.06m                                                                            |
| Gradient:               | 60%                                                                              |
| Side slope:             | 30%                                                                              |
| Armour:                 | Classified                                                                       |
| Armour type:            | Steel                                                                            |
| NBC system:             | Yes                                                                              |
| Night vision equipment: | Yes (commander and driver)                                                       |

## DEVELOPMENT

In 1988, the Diesel Division of General Motors of Canada designed and built the prototype of an 8x8 APC as a private venture. This was based on the chassis and automotive components of the Light Armoured Vehicle (LAV) that it has built for the United States Marine Corps (qv). The Canadian Army subsequently placed an order for 199 of a modified version for the Militia called the Bison and first production vehicles were completed in late 1990.

The driver is seated at the front of the vehicle on the left with the commander being seated to his rear with a raised cupola, the powerpack is to the right of the driver with the remainder of the hull being occupied by the troop compartment. The infantry are seated on seats on either side of the troop compartment and enter via a large hydraulic operated ramp in the rear. Over the top of the troop compartment are hatches that open either side of the roof. There is no provision for the troops to fire their weapons from within the vehicle.

The Bison is fully amphibious being propelled in the water by two propellers mounted at the rear of the hull and before entering the water a trim vane is erected at the front of the vehicle which, when not required, folds back under the nose. Steering is power assisted on the front four road wheels and standard equipment includes a winch and fire detection and suppression system.

**VARIANTS**

The Canadian Armed Forces order comprises 149 APCs, 18 command post vehicles, 16 81mm mortar carriers and 16 maintenance and repair vehicles that are fitted with a hydraulic crane.

Coyote, 8 x 8 vehicle with LAV-25 turret plus mast sensors for recon role.

Kodiak, 8 x 8 vehicle with LAV-25 turret, troop carrier.

**STATUS**

In production. In service with Australia, Canada and the United States (National Guard).

**MANUFACTURER**

Diesel Division, General Motors of Canada, London, Ontario, Canada.

*Right: Bison (8x8) ARC*



# Diesel Division, General Motors of Canada, Light Armored Vehicle 25 (LAV-25) (Canada)

## KEY RECOGNITION FEATURES

- Long hull with nose sloping back under front to first road wheel station, well sloped glacis plate leading to horizontal roof, vertical hull rear with two doors
- Four road wheels each side, upper part of hull sloping inwards, equal gap between first and second and third and fourth road wheels
- Turret to rear of vehicle and offset to left, flat front, sides and rear that slope inwards, basket rear

## SPECIFICATIONS

|                        |                                                                                                             |
|------------------------|-------------------------------------------------------------------------------------------------------------|
| Crew:                  | 3+6                                                                                                         |
| Configuration:         | 8x8                                                                                                         |
| Armament:              | 1 x 25mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft, optional), 2 x 4 smoke grenade dischargers |
| Ammunition:            | 630 x 25mm, 1,620 x 7.62mm                                                                                  |
| Length:                | 6.393m                                                                                                      |
| Width:                 | 2.499m                                                                                                      |
| Height overall:        | 2.692m                                                                                                      |
| Ground clearance:      | 0.5m                                                                                                        |
| Wheelbase:             | 1.1m + 1.135m + 1.04m                                                                                       |
| Weight, combat:        | 12,792kg                                                                                                    |
| Weight, empty:         | 10,932kg                                                                                                    |
| Power-to-weight ratio: | 21.34hp/tonne                                                                                               |
| Engine:                | Detroit Diesel 6V-53T, 6-cylinder diesel developing 275hp at 2,800rpm                                       |
| Maximum road speed:    | 100km/hr                                                                                                    |
| Maximum water speed:   | 9.656km/hr                                                                                                  |
| Maximum range:         | 668km                                                                                                       |
| Fuel capacity:         | 300 lit                                                                                                     |
| Fording:               | Ambipitibus                                                                                                 |
| Vertical obstacle:     | 0.5m                                                                                                        |
| Trench:                | 2.057m                                                                                                      |
| Gradient:              | 600/o                                                                                                       |
| Side slope:            | 30°/o                                                                                                       |
| Armour:                | 10mm (estimate)                                                                                             |
| NBC system:            | None                                                                                                        |

Night vision equipment: Yes (passive, commander, gunner and driver)

## DEVELOPMENT

To meet a US Marine Corps requirement for a Light Armored Vehicle (LAV) prototypes were built by Diesel Division, General Motors of Canada, Alvis, and Cadillac Gage. In 1982 Diesel Division, General Motors of Canada 8x8 (based on Swiss MOWAG Piranha series) was selected and 758 ordered over a five-year period from FY82 to FY85 in six basic versions. US Army was also involved in the programme but subsequently withdrew. First production vehicles, LAV-25s, were delivered in October 1983 with final deliveries in 1987.

LAV has driver front left, engine compartment to right, two-man power-operated turret to rear, troop compartment at far rear. Six troops sit three each side back to back, six firing ports and vision blocks. Vehicle is fully amphibious with two propellers mounted at rear. Before entering the water a trim vane is erected at front of vehicle and bilge pumps switched on. Turret is armed with 25mm M242 Chain Gun as installed in M2 Bradley, with 7.62mm M240 MG mounted coaxial and optional 7.62mm or 12.7mm MG on turret roof for anti-aircraft defence. Turret traverse is 360°, weapon elevation from -10° to +60°.

## VARIANTS

LAV logistics has two-man crew, higher roof and crane. In service.

LAV mortar has 81mm mortar in rear. In service.

LAV maintenance/recovery has five-man crew, crane. In service.

LAV anti-tank has three-man crew, same turret as M901s. Improved TOW vehicle has two TOW in ready-to-launch position. In service.

LAV **command and control** is similar to logistics with higher hull. In service.

LAV Mobile Electronic Warfare Support System (MEWS), raised roof. In service.

Anti-aircraft (Marine Corps), fitted with turret armed with 25mm cannon and Stinger SAMs, prototype stage.

Assault Gun Vehicle, armed with 105mm gun, prototypes only.

**Saudi Arabia** has many variants including 120mm Armoured Mortar System, 90mm assault gun and anti-tank with HOT ATGW.

LAV can be fitted with many other weapon systems.

Bison (8x8) ARC (qv).

Coyote, recce vehicle for Canada (25mm turret)

Kodiak, ARC for Canada (25mm turret)

### STATUS

In production. In service with Australia, Canada, Saudi Arabia and United States (Army and Marine Corps).

### MANUFACTURER

Diesel Division, General Motors of Canada Limited, London, Ontario, Canada.

*Above right: Coyote (8 x 8) reconnaissance vehicle*

*Right: Bison (8 x 8) APC*



## u-r-G4C(I) (SKOT-2A) APC (Former Czechoslovakia)

### KEY RECOGNITION

#### FEATURES

- 8x8 chassis with equal spaces between first/second and third/fourth wheels, larger gap between second/third
- Blunt nose with vertical hull sides sloping slightly inwards at top, rear slopes outwards, exhaust pipes on both sides of hull, trim vane front
- OT-64C(IJ) has flat topped turret on plinth just forward of third wheel station

### SPECIFICATIONS

|                         |                                                                 |
|-------------------------|-----------------------------------------------------------------|
| Crew:                   | 2+10                                                            |
| Configuration:          | 8x8                                                             |
| Armament:               | 1 x 14.5mm MG (main), 1 x 7.62mm MG (coaxial)                   |
| Ammunition:             | 500 x 14.5mm, 2,000 x 7.62mm                                    |
| Length:                 | 7.44m                                                           |
| Width:                  | 2.55m                                                           |
| Height:                 | 2.71m (turret top), 2.06m (hull top)                            |
| Ground clearance:       | 0.46m                                                           |
| Wheelbase:              | 1.3m + 2.15m + 1.3m                                             |
| Weight, combat:         | 14,500kg                                                        |
| Weight, unloaded:       | 12,800kg                                                        |
| Power-to-weight ratio:  | 12.41hp/tonne                                                   |
| Engine:                 | Tatra 928 18 V-8 air-cooled diesel developing 180hp at 2,000rpm |
| Maximum road speed:     | 94.4km/hr                                                       |
| Maximum water speed:    | 9km/hr                                                          |
| Maximum road range:     | 710km                                                           |
| Fuel capacity:          | 330 lit                                                         |
| Fording:                | Amphibious                                                      |
| Vertical obstacle:      | 0.5m                                                            |
| Trench:                 | 2m                                                              |
| Gradient:               | 60%                                                             |
| Side slope:             | 30%                                                             |
| Armour:                 | 14mm (max turret), 10mm (max hull)                              |
| Armour type:            | Steel                                                           |
| NBCjystenr:             | Yes                                                             |
| Night vision equipment: | Yes (infra-red for driver)                                      |

### DEVELOPMENT

OT-64 (Obmeny Transporter) series 8x8 was developed by Former Czechoslovakia and Poland from 1959, first production vehicles completed in 1964. In these countries it is used in place of the similar Soviet-designed and built BTR-60 (8x8). Tatra of Czechoslovakia built the chassis and FSC/Lubin of Poland the armoured body.

OT-64 (designated SKOT by Poland) is fully amphibious with two propellers at the rear. Before entering the water a trim vane is erected at the front and bilge pumps switched on. All vehicles have powered steering on front four wheels and central tyre pressure regulation system.

### VARIANTS

OT-62A (SKOT), original model armed with pintle-mounted 7.62mm MG (Poland) or unarmed (Czechoslovakia). Some fitted with two Sagger ATGWs over rear troop compartment.

OT-64B (SKOT-2), used only by Poland. Square plinth with pintle-mounted 7.62mm or 12.7mm MG with shield.

OT-64C(1J) (SKOT-2A) has same turret as fitted to Soviet BRDM-2, BTR-60PB and BTR-70 vehicles and armed with one 14.5mm KPVT and one 7.62mm PKT coaxial MG with elevation from -4° to +29°. Turret traverse is 360°. Both elevation and traverse are manual.

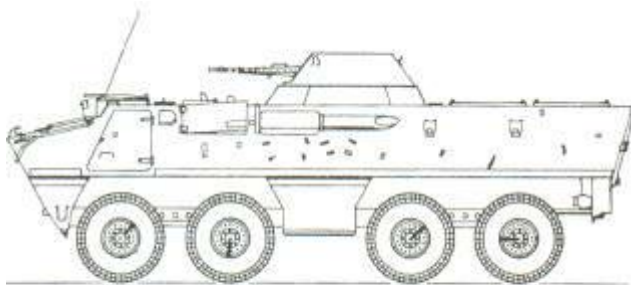
OT-64C(2) (SKOT-2AP), used only by Poland. Same as SKOT-2A but has new turret with same armament, curved top for higher elevation of +89.5°. Turret also fitted to OT-62C. Some vehicles have AT-3 Sagger ATGI/V mounted each side of turret.

OT-64CQJ with OT-62B turret. Morocco has a few of these local conversions.

DPT-64, is OT-64 modified for repair role.

OT-64 R-2M is command version.

## 8x8 VEHICLES



OT-64 R-3MT and OT-64 R-4MT are radio versions.  
 OT-93 is SKOT with new turret armed with single 7.62mm  
 MG  
 WPT, armoured repair and maintenance vehicle.  
 Other versions include artillery resupply, minelayer, repair  
 and maintenance, OT-64 R-3Z, OT-64 R4 and OT-64 R6, all of  
 which are Polish.

### STATUS

Production complete. In service with Algeria, Cambodia,  
 Czech Republic, India, Iraq, Libya, Morocco (status uncertain),  
 Poland, Sierra Leone, Slovakia, Sudan, Syria and Uganda  
 (status uncertain).

### MANUFACTURER

Czechoslovak and Polish state factories.

**Above: OT-  
 62C(1)  
 (SKOT-2A)  
 (8x8)**

**Above right:  
 OT-62A  
 (SKOT)**

**Right: OT-  
 64C(1)  
 SKOT-2A)  
 (Richard  
 Stickland)**





# Henschel Wehrtechnik

## Spahpanzer Luchs Reconnaissance Vehicle (Germany)

### KEY RECOGNITION

#### FEATURES

- High hull with well sloped glacis plate on forward part of which is trim vane, horizontal hull top, turret slightly forward of vehicle centre, sloping hull rear
- Vertical hull sides sloping inward above wheels, access door in left hull side between second and third road wheels
- Four large road wheels each side with equal space between first/second and third/fourth road wheels, two propellers under hull rear

### SPECIFICATIONS

Crew:

Configuration:

Armament:

Ammunition:

Length:

Width:

Ground clearance:

Wheelbase:

Weight, combat:

Power-to-weight ratio:

Engine:

Maximum road speed:

Maximum water speed:

Maximum range:

Fuel capacity:

Fording:

Vertical obstacle:

Trench:

Gradient:

Side slope:

Armour:

Armour type:

8x8

1 x 20mm, 1 x 7.62mm MG (anti-aircraft), 2 x 4 smoke grenade dischargers

375 x 20mm (turret),  
100 x 7.62mm (turret)

7.743m

2.98m

2.905m (MG rail), 2.125m (hull top)

0.44m (hull), 0.58m (axles)

1.4m + 2.356m + 1.4m

20,000kg

20hp/tonne

Daimler-Benz OM 403 A 10-cylinder  
90° V-4 stroke multifuel developing  
390hp at 2,500rpm (diesel fuel)

90km/hr

9km/hr

730km

500 lit

Amphibious

0.6m

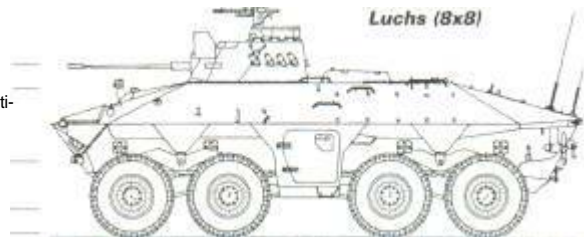
1.9m

UF:

0°

Classified

Steel



NBCjystem^

Yes

Night vision equipment: Yes (passive for commander,  
gunner and driver)

### DEVELOPMENT

In the mid-1960s the then West German Army issued a requirement for a new 8x8 armoured amphibious reconnaissance vehicle and after trials with two competing designs the Daimler-Benz model was selected. In December 1973 Rhein Stahl Wehrtechnik (now Henschel Wehrtechnik) was awarded a contract for 408 vehicles. First production vehicles, known officially as the Spahpanzer Luchs, were delivered in 1975 and production continued until early 1978.

Driver sits front left, to his rear is the two-man turret, engine is rear on right side, second driver/radio operator is left side facing rear. Turret has full power traverse through 360°, weapon elevation from -15° to +69°. Manual controls provided for emergency use. The 7.62mm MG is mounted on a ring mount



above commander's hatch on left side.

Luchs is fully amphibious, propelled by two propellers mounted rear. Steering is power-assisted and all eight wheels can be steered. When originally introduced into service Luchs had infra-red night vision equipment for all crew members, but this has now been replaced by thermal night vision equipment. Luchs has the same speed forwards and backwards.

#### VARIANTS

No variants in service, although its chassis was proposed for a more mobile version of Euromissile Roland SAM.

As a private venture, Henschel Wehrtechnik has developed a



new family of 4x4 (TH200), 6x6 (TH400) and 8x8 (TH800) armoured vehicles but so far none of these has entered production. The APE amphibious engineer reconnaissance vehicle was designed at the same time as Luchs but never entered production.

#### STATUS

Production complete. In service with Germany Army only.

#### MANUFACTURER

Henschel Wehrtechnik, Kassel, Germany.

*Above left: Luchs (8x8)  
(Michael Jerchel)*

*Above: Luchs (8x8)  
(Michael Jerchel)*

# Consortium IVECO-OTOBREDA

## Centauro Tank Destroyer (Italy)

### KEY RECOGNITION FEATURES

- High hull with well sloped glacis plate, nose slopes back under hull. Horizontal hull roof with hull rear containing a door that opens to the right, hull rear slopes inwards
- Turret mounted towards rear of vehicle with distinctive external mantlet, turret sides slope slightly inwards with bank of four smoke grenade dischargers either side, 105mm gun extends over front of vehicle and has muzzle brake, thermal sleeve and fume extractor
- Four large road wheels either side with slightly larger gap between first and second road wheels. Upper part of hull slopes inwards with louvres in right side of hull above 1st/2nd road wheels

### SPECIFICATIONS

|                         |                                                                                                    |
|-------------------------|----------------------------------------------------------------------------------------------------|
| Crew:                   | 4                                                                                                  |
| Configuration:          | 8x8                                                                                                |
| Armament:               | 1 x 105mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 2 x 4 smoke grenade dischargers |
| Ammunition:             | 40 x 105mm, 4,000 x 7.62mm                                                                         |
| Length with gun:        | 8.555m                                                                                             |
| Length hull:            | 7.85m                                                                                              |
| Width:                  | 3.05m                                                                                              |
| Height:                 | 2.735m                                                                                             |
| Ground clearance:       | 0.417m                                                                                             |
| Wheelbase:              | 1.6m + 1.45m + 1.45m                                                                               |
| Weight, combat:         | 25,000kg                                                                                           |
| Power-to-weight ratio:  | 20.8hp/tonne                                                                                       |
| Engine:                 | IVECO FIAT MTCA V-6 turbocharged diesel developing 520hp at 2,300rpm                               |
| Maximum road speed:     | 105+km/hr                                                                                          |
| Range:                  | 800km                                                                                              |
| Fuel capacity:          | 540 lit                                                                                            |
| Fording:                | 1.5m                                                                                               |
| Vertical obstacle:      | 0.55m                                                                                              |
| Trench:                 | 1.2m                                                                                               |
| Gradient:               | 60°/o                                                                                              |
| Side slope:             | 30%                                                                                                |
| Armour:                 | Classified                                                                                         |
| Armour type:            | Steel                                                                                              |
| NBC system:             | Yes                                                                                                |
| Night vision equipment: | Yes (passive)                                                                                      |

### DEVELOPMENT

The Centauro (8x8) tank destroyer is the first of a complete new family of armoured vehicles developed for the Italian Army to enter production. The others are the Ariete MBT (qv), Dardo IFV (qv) and the Puma range of 4x4 and 6x6 vehicles (qv).

OTOBREDA has responsibility for the tracked vehicles and armament aspects of all vehicles. IVECO is responsible for the wheeled vehicles and automotive aspects of all Tracked vehicles.

Following trials with a number of prototypes the Italian Army placed an order for the vehicle and the first production vehicles were completed in 1991. The original requirement was for some 450 vehicles but this has since been trimmed back to 400. IVECO at Bolzano build the chassis of the Centauro and integrate this with the complete turret which is supplied by OTOBREDA at La Spezia.

The driver is seated on the left side of the vehicle at the front with the powerpack to his right and the power-operated turret at the rear. The commander and gunner are seated on the right with the loader being seated on the left. In addition to the two roof hatches there is also a hatch in the rear for crew escape and ammunition resupply. Turret traverse is a full 360° with weapon elevation from -6° to +15°, turret traverse and weapon elevation is powered with manual controls being provided for emergency use. The computerised fire control system is similar to that used in the Ariete MBT and includes a commander's stabilised sight and day/night sight for the gunner. Suspension system is of the hydropneumatic type with steering being power assisted on the front four wheels and standard equipment includes a central tyre pressure regulation system that allows the ground pressure to be adjusted to suit the type



of terrain being crossed, winch located in the front of the hull and a fire detection and suppression system. For operations in the Balkans the Centauro has been fitted with additional armour.

#### **VARIANTS**

APC (prototype), ARV (projected) and 155mm SPG (project).

#### **STATUS**

Production complete. In service with the Italian Army.

#### **MANUFACTURER**

IVECO FIAT, Bolzano, Italy

***Above: IVECO FIAT Centauro***

***Right: IVECO FIAT Centauro***



# TAB-77 APC (Romania)

## KEY RECOGNITION FEATURES

- Looks very similar to the Russian 6TR-80 but has different turret with distinctive sight on left side and no smoke grenade launchers on the turret rear

- Four large road wheels each side, with door in lower part of hull between second and third road wheels, upper part of hull slopes inwards, trim vane folds back on to glassis

- Pointed front with commander and driver seated towards front and turret on roof in line with second road wheel, long exhaust pipe on either side of hull above last road wheel

## SPECIFICATIONS

|                         |                                                                |
|-------------------------|----------------------------------------------------------------|
| Crew:                   | 3+9                                                            |
| Configuration:          | 8x8                                                            |
| Armament:               | 1 x 14.5mm MG (main),<br>1 x 7.62mm MG (coaxial)               |
| Ammunition:             | 600 x 14.5mm, 2,500 x 7.62mm                                   |
| Length:                 | 7.4m                                                           |
| Width:                  | 2.95m                                                          |
| Height:                 | 1.92m (turret top)                                             |
| Ground clearance:       | 0.525m                                                         |
| Wheelbase:              | 4.392m                                                         |
| Weight, combat:         | 13,350kg                                                       |
| Power-to-weight ratio:  | 19.77hp/tonne                                                  |
| Engine:                 | 2 x Model 797-05M1 diesels, each developing 132 hp at 3000 rpm |
| Maximum road speed:     | 83km/hr                                                        |
| Maximum road range:     | 550km                                                          |
| Fuel capacity:          | 290 litres                                                     |
| Fording:                | Amphibious                                                     |
| Vertical obstacle:      | 0.5m                                                           |
| Trench:                 | 2m                                                             |
| Gradient:               | 60%                                                            |
| Side slope:             | 30%                                                            |
| Armour:                 | 8mm (estimate)                                                 |
| NBC system:             | Yes                                                            |
| Night vision equipment: | Yes                                                            |

## DEVELOPMENT

In the 1960s Romania developed the TAB-71 (see next entry): a version of the BTR-60PB. This was followed by the TAB-77, based on the BTR-70, but with minor differences. It has a new turret of local design and the original petrol engines are replaced by two



*Above: TAB-77 (8x8)*

locally manufactured diesel units. The commander and driver sit at the front with one man manually operating the turret to their rear. The troop compartment extends almost to the rear where the engine compartment is located.

The turret traverses through 360 degrees and the turret armament elevates from -5 to +85 degrees. The TAB-77 is fully amphibious, being propelled in the water by a single waterjet mounted in the rear. Before entering the water, bilge pumps are switched on and the trim vane at the front is erected. Standard equipment includes a central tyre pressure regulation system, fire detection and suppression system, and a winch.

## VARIANTS

TAB-77 PCOMA, armoured artillery command post vehicle  
TAB-77A, armoured command post vehicle  
TERA-77L, maintenance and recovery vehicle.

B33, latest model of TAB-77 with one 268hp diesel engine RN-94, 6 x 6 APC developed by Romania and Turkey (qv)

## STATUS

Production complete. In service with Romania.



**MANUFACTURERS**  
Romanian state factories

*Above: TAB-77 (8x8)*

# TAB-71 APC (Romania)

## KEY RECOGNITION FEATURES

- Four equally spaced road wheels each side
- Hull sides slope slightly inwards with square door in each side above second/third road wheel, three firing ports each side
- Mounted on roof of vehicle, above the second road wheel, is the turret which is similar to that of the former Soviet BTR-60PB (8x8) APC (qv) but has a distinctive sight mounted externally to the left of the weapons

## SPECIFICATIONS

|                         |                                                       |
|-------------------------|-------------------------------------------------------|
| Crew:                   | 3+8                                                   |
| Configuration:          | 8x8                                                   |
| Armament:               | 1 x 14.5mm MG (main),<br>1 x 7.62mm MG (coaxial)      |
| Ammunition:             | 500 x 14.5mm, 2,000 x 7.62mm                          |
| Length:                 | 7.22m                                                 |
| Width:                  | 2.83m                                                 |
| Height:                 | 2.7m (turret top)                                     |
| Ground clearance:       | 0.47m                                                 |
| Wheelbase:              | 4.21m                                                 |
| Weight, combat:         | 11,000kg                                              |
| Power-to-weight ratio:  | 25.4hp/tonne                                          |
| Engine:                 | 2 x V-6 liquid cooled petrol<br>developing 140hp each |
| Maximum road speed:     | 95km/hr                                               |
| Maximum water speed:    | 10km/hr                                               |
| Maximum road range:     | 500km                                                 |
| Fuel capacity:          | 290 lit                                               |
| Fording:                | Amphibious                                            |
| Vertical obstacle:      | 0.4m                                                  |
| Trench:                 | 2m                                                    |
| Gradient:               | 60%                                                   |
| Side slope:             | 30%                                                   |
| Armour:                 | 9mm (max turret), 7mm (max hull)                      |
| Armour type:            | Steel                                                 |
| NBC system:             | Yes                                                   |
| Night vision equipment: | Yes (infra-red for driver)                            |

## DEVELOPMENT

TAB-71 (8x8) was first seen in public during 1972 and is the Romanian equivalent of the former Soviet BTR-60PB (8x8) but with at least two major improvements: more powerful engines (2 x 140hp compared with 2 x 90hp of Soviet vehicle) and machine guns with higher elevation for use in the anti-aircraft role. TAB-71 is fully amphibious, propelled by a single waterjet at rear of hull. Central tyre pressure regulation system. Turret has manual traverse and MGs elevate manually from -5° to +85°.

## VARIANTS

TAB-71 M, virtually same as standard TAB-71.

TAB-71 AR, TAB-71 with turret removed and fitted with 81mm mortar.

TERA-71L, TAB-71 modified for maintenance and recovery role. TAB-71A R1 450, TAB-71A RI 451, TAB-71A RI 452, TAB-71 modified for armoured command vehicle.

The TAB-71 was replaced in production by the TAB-77 for which there is a separate entry.

Note: TAB-79 (4x4) APC (qv)

## STATUS

Production complete. In service with Moldova, Romania and Yugoslavia (small number).

## MANUFACTURER

Romanian state factories.

*Right: TAB-TI (8x8) APC*





# BTR-80 APC (Russia)

## KEY RECOGNITION FEATURES

- Similar in appearance to BTR-70 (8x8) APC (qv) but similar turret has a bank of six forward firing smoke grenade dischargers mounted on turret rear
- Between second and third road wheels is a new hatch/door arrangement, upper part opens to right and lower part opens downwards to form a ramp
- Hull rear is different from BTR-70/BTR-80 and has higher roof line with exhaust pipe almost horizontal

## SPECIFICATIONS

|                         |                                                                     |
|-------------------------|---------------------------------------------------------------------|
| Crew:                   | 3+7                                                                 |
| Configuration:          | 8x8                                                                 |
| Armament:               | 1 x 14.5mm MG, 1 x 7.62mm MG (coaxial), 6 smoke grenade dischargers |
| Ammunition:             | 500 x 14.5mm, 2,000 x 7.62mm                                        |
| Length:                 | 7.65m                                                               |
| Width:                  | 2.90m                                                               |
| Height:                 | 2.35m                                                               |
| Ground clearance:       | 0.475m                                                              |
| Weight, combat:         | 13,600kg                                                            |
| Power-to-weight ratio:  | 19.11hp/tonne                                                       |
| Engine:                 | 4-stroke V-8 water-cooled diesel developing 260hp                   |
| Maximum road speed:     | 90km/hr                                                             |
| Maximum water speed:    | 9.5km/hr                                                            |
| Road range:             | 600km                                                               |
| Fuel capacity:          | 300 lit                                                             |
| Fording:                | Amphibious                                                          |
| Vertical obstacle:      | 0.5m                                                                |
| Trench:                 | 2m                                                                  |
| Gradient:               | 60%                                                                 |
| Side slope:             | 30%                                                                 |
| Armour:                 | 7mm (max turret), 9mm (max hull)                                    |
| Armour type:            | Steel                                                               |
| NBC system:             | Yes                                                                 |
| Night vision equipment: | Yes (infra-red for commander and driver)                            |

## DEVELOPMENT

BTR-70 (8x8) had a number of improvements over the original BTR-60 (8x8) family but still have disadvantages including two petrol engines and poor means of entry and exit. In the early 1980s the former Soviet Army took delivery of a new vehicle, BTR-80, which has the same layout as BTR-70 but a single V-8 diesel developing 260hp. The one-man manually operated turret is similar to BTR-70's but the 14.5mm KPVT MG elevates to +60° so it can be used against slow-flying aircraft and helicopters. The 7.62mm PKT MG is retained. Mounted on turret rear is a bank of six smoke grenade dischargers firing forwards. There are three firing ports in each side of troop compartment. Between second and third axles is a new hatch arrangement: upper part opens to front and lower part folds down to form step allowing infantry to leave more safely.

BTR-80 is fully amphibious, propelled by a single waterjet at rear, has central tyre pressure regulation system, steering on front four road wheels, front-mounted winch, NBC system and infra-red night vision equipment for driver and commander who sit at front of vehicle.

## VARIANTS

BTR-80 MI 989/1, this is a command vehicle with additional communications equipment.  
120mm 2S23 self-propelled gun, details of this vehicle, essentially a BTR-80 with the turret of the 2S9 are given in the Self-propelled Guns and Howitzers section.  
RKhM-4 chemical and reconnaissance vehicle.  
BREM-K armoured recovery vehicle.  
BTR-80A has new turret with externally mounted 30mm cannon and 7.62mm machine gun.

BMM armoured medical vehicle

BTR-80 with Kliver turret

# **STATUS**

Production. In service with Afghanistan, Armenia, Azerbaijan, Bangladesh, Belarus, Estonia, Finland, Georgia, Hungary, Kazakhstan, Korea (South), Moldova, Russia, Tajikistan, Turkey, Turmenistan, Ukraine and Uzbekistan.

# **MANUFACTURER**

Arzamas Machinery Construction Plant.

*Below: BTR-80 (8x8) APC (Christopher F Foss)*

*Right: BTR-80 (8x8) APC*

*Below right: BTR-80A (8x8) APC (Christopher F Foss)*



# 120mm 2S23 self-propelled gun mortar (Russia)

## KEY RECOGNITION FEATURES

- Based on BTR-80 (8x8) APC chassis with four road wheels each side with larger gap between second/third road wheel
- Large turret mounted in centre of hull roof, with 120mm ordnance mounted in sloping turret front, turret sides curve to rear with three smoke grenade dischargers either side

## SPECIFICATIONS

|                         |                                                                                  |
|-------------------------|----------------------------------------------------------------------------------|
| Crew:                   | 4                                                                                |
| Configuration:          | (8x8)                                                                            |
| Armament:               | 1 x 120mm mortar, 1 x 7.62mm MG (anti-aircraft), 2 x 3 smoke grenade dischargers |
| Ammunition:             | 30 x 120mm, 500 x 7.62mm                                                         |
| Length:                 | 7.40m                                                                            |
| Width:                  | 2.90m                                                                            |
| Height:                 | 2.495m                                                                           |
| Ground clearance:       | 0.475m                                                                           |
| Weight, combat:         | 14,500kg                                                                         |
| Power-to-weight ratio:  | 17.93hp/tonne                                                                    |
| Engine:                 | Four stroke V-8 water-cooled diesel developing 260hp                             |
| Maximum road speed:     | 80km/hr                                                                          |
| Maximum water speed:    | 10km/hr                                                                          |
| Maximum road range:     | 500km                                                                            |
| Fuel capacity:          | 290 lit                                                                          |
| Fording:                | Amphibious                                                                       |
| Vertical obstacle:      | 0.5m                                                                             |
| Trench:                 | 2m                                                                               |
| Gradient:               | 60%                                                                              |
| Side slope:             | 30%                                                                              |
| Armour:                 | 15mm                                                                             |
| Armour type:            | Steel                                                                            |
| NBC system:             | Yes                                                                              |
| Night vision equipment: | Yes (infra-red for driver)                                                       |

## DEVELOPMENT

The 120mm 2S23 (this being its industrial number) is essentially the BTR-80 armoured personnel carrier (qv) fitted with a 120mm breech loaded mortar in a turret. The mortar is related to the 120mm weapon of the 2B16 towed combination gun which is also known as the IMONA-K. The 2S23 is also referred to as the NONA-SVK while the tracked 2S9 (qv) is referred to as the NONA-S.

The standard BTR-80 hull has been modified in a number of areas including removal of the firing ports and associated vision devices, modified door between second and third road wheels and modified roof hatches.

The turret is armed with a 120mm breech-loaded ordnance that fires a variety of projectiles to a maximum range of 8,850m, turret traverse is 35° left and right with weapon elevation from -4° to +80°. A rocket assisted projectile has a maximum range of 12,850m. In addition to firing projectiles of Russian design, it can also fire French TDA 120mm mortar projectiles.

The 2S23 is fully amphibious being propelled in the water by a single waterjet at the hull rear. Before entering the water a trim vane is erected at the front of the hull.

## VARIANTS

There are no known variants of this system. Some 2S23 systems have however been observed fitted with thermal screens to the hulls and turrets.

## STATUS

Production. In service with China and Russia.

## MANUFACTURER

Russianstatefactories.



*Above: 120mm 2S23 self-propelled gun/mortar system*



*Above right: 120mm 2S23 self-propelled gun/mortar system with thermal screens (Christopher F Foss)*

*Right: 120mm 2S23 self-propelled gun/mortar system with thermal screens (Christopher F Foss)*



# BTR-70 APC (Russia)

## KEY RECOGNITION FEATURES

- Similar in appearance to BTR-60B but with small door in lower part of hull between second and third road wheels, trim vane folds back onto glacis plate (on BTR-60 it folds under nose), commander's hatch front right is slightly domed, waterjet opening in hull rear has two-piece cover with hinge at top. BTR-80 also has different hull rear

- Commander and driver sit front, turret on roof in line with second road wheel, horizontal hull top which slopes down at far rear, exhaust pipe each side of hull at rear

- Four large rubber-tyred road wheels each side with slightly larger gap between second and third

## SPECIFICATIONS

|                         |                                                           |
|-------------------------|-----------------------------------------------------------|
| Crew:                   | 2+9                                                       |
| Configuration:          | 8x8                                                       |
| Armament:               | 1 x 14.5mm MG,<br>1 x 7.62mm MG (coaxial)                 |
| Ammunition:             | 500 x 14.5mm, 2,000 x 7.62mm                              |
| Length:                 | 7.535m                                                    |
| Width:                  | 2.8m                                                      |
| Height top of turret:   | 2.235m                                                    |
| Ground clearance:       | 0.475m                                                    |
| Wheelbase:              | 4.4m                                                      |
| Weight, combat:         | 11,500kg                                                  |
| Power-to-weight ratio:  | 20.86hp/tonne                                             |
| Engines:                | 2 x ZMZ-4905 6-cylinder petrol<br>developing 120hp (each) |
| Maximum road speed:     | 80km/hr                                                   |
| Maximum water speed:    | 10km/hr                                                   |
| Maximum road range:     | 600km                                                     |
| Fuel capacity:          | 350 lit (estimate)                                        |
| Fording:                | Amphibious                                                |
| Vertical obstacle:      | 0.5m                                                      |
| Trench:                 | 2m                                                        |
| Gradient:               | 60%                                                       |
| Side slope:             | 400/0                                                     |
| Armour:                 | 9mm (maximum) (estimate)                                  |
| Armour type:            | Steel                                                     |
| NBC system:             | Yes                                                       |
| Night vision equipment: | Yes (infra-red for driver<br>and commander)               |

## DEVELOPMENT

BTR-70 is a further development of BTR-60 and was first shown in public during a Moscow parade in 1980. Main improvements over the BTR-60PB are slightly more powerful petrol engines which give improvement in power-to-weight ratio, improved vision for the troops with additional firing ports, and improved armour protection.

Commander and driver sit front with troop compartment extending towards rear, engines rear. Turret identical to BRDM-2 reconnaissance vehicle's, BTR-60PB's and armed with 14.5mm and a 7.62mm MG. Turret traverse is manual through 360°, weapons elevate from -5° to +30°. Steering is power-assisted on front four wheels, standard equipment includes front-mounted winch and central tyre pressure regulation system. BTR-70 is fully amphibious, propelled by a single waterjet mounted at rear of hull. Before entering the water a trim vane is erected at front and bilge pumps switched on.

## VARIANTS

Some BTR-70s in Afghanistan were fitted with 30mm AGS-17 grenade launcher mounted on roof to rear of driver.

BTR-70MS is a turretless communications vehicle.

BTR-70KShM is a command/staff vehicle.

BREM is a turretless BTR-70 with bow-mounted jib crane and other equipment.

BTR-70Kh is chemical reconnaissance vehicle.

SPR-2 is a possible radar jamming variant.

Some BTR-70S have been fitted with complete turret of later BTR-80 (8x8) APC.





#### STATUS

Production complete. In service with Afghanistan, Armenia, Azerbaijan, Belarus, Estonia, Georgia, Hungary, Kazakhstan, Krygystan, Macedonia, Moldova, Pakistan, Romania, Russia, Tajikistan, Turmenistan, Ukraine and Uzbekistan.

#### MANUFACTURER

Gorkiy Automobile Plant, Gorkiy, former USSR.

**Above:** *BTR-70 (8x8) (Michael Jerchel)*

**Above right:** *BTR-70 (8x8)*

**Right:** *BTR-70 (8x8) (Michael Jerchel)*





# BTR-60PB APC (Russia)

## KEY RECOGNITION FEATURES

- Four road wheels each side with slightly larger gap between second and third
- Well sloped flat top turret on forward part of roof above second wheel station, square side door above second and third axle
- Blunt nose with engine at far rear and exhaust pipe on each side at 45°

## SPECIFICATIONS

|                         |                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------|
| Crew:                   | 2+14                                                                                |
| Configuration:          | 8x8                                                                                 |
| Armament:               | 1 x 14.5mm MG (main), 1 x 7.62mm MG (coaxial)                                       |
| Ammunition:             | 500 x 14.5mm, 2,000 x 7.62mm                                                        |
| Length:                 | 7.56m                                                                               |
| Width:                  | 2.835m                                                                              |
| Height:                 | 2.31m (turret top), 2.055m (hull top)                                               |
| Ground clearance:       | 0.475m                                                                              |
| Wheelbase:              | 1.35m + 1.525m + 1.35m                                                              |
| Weight, combat:         | 10,300kg                                                                            |
| Power-to-weight ratio:  | 17.47hp/tonne                                                                       |
| Engines:                | 2 x GAZ-49B 6-cylinder in-line water-cooled petrol developing 90hp at 3,400rpm each |
| Maximum road speed:     | 80km/hr                                                                             |
| Maximum water speed:    | 10km/hr                                                                             |
| Maximum road range:     | 500km                                                                               |
| Fuel capacity:          | 290 lit                                                                             |
| Fording:                | Amphibious                                                                          |
| Vertical obstacle:      | 0.4m                                                                                |
| Trench:                 | 2m                                                                                  |
| Gradient:               | 60%                                                                                 |
| Side slope:             | 40%                                                                                 |
| Armour:                 | 7mm (max turret), 9mm (max hull)                                                    |
| Armour type:            | Steel                                                                               |
| NBC system:             | Yes                                                                                 |
| Night vision equipment: | Yes (infra-red for commander and driver)                                            |

## DEVELOPMENT

BTR-60P series 8x8s were developed in the late 1950s to replace BTR-152 (6x6) and were first seen in public in 1961. Throughout the 1960s it was continuously improved, final production model being BTR-60PB. It was replaced in production by the similar BTR-70 (8x8).

All members of BTR-60P series are fully amphibious, propelled by a single waterjet mounted at hull rear, have a 4,500kg capacity front-mounted winch, powered steering on front four wheels and central tyre pressure regulation system. BTR-60PB has fully enclosed troop compartment on top of which is a one-man turret almost identical to the BRDM-2 (4x4) amphibious scout car's. Turret has one 14.5mm KPVT MG with 7.62mm PKT MG mounted coaxial to right, both have manual elevation from -5° to +30°, turret traverse through 360°.

## VARIANTS

BTR-60P, first production model with open roof, has one to three 7.62mm MGs or 1 x 12.7mm and 2 x 7.62mm MGs.  
 BTR-60PA, second production model with fully enclosed troop compartment, first model with NBC system, roof-mounted 7.62mm MG.  
 BTR-60PB has 14.5mm/7.62mm turret of BRDM-2 and OT-64C(1).  
 BTR-60PBK, command version of BTR-60PB.  
 BTR-60 1V18, artillery observation post vehicle.  
 BTR-60 1V19, fire direction centre vehicle.  
 BTR-60 communications are numerous and normally have an R or E designation, eg BTR-60-R-409BM.  
 BTR-60AVS, command post vehicle.  
 BTR-60PAU, artillery communications vehicle.  
 BTR-60PU-12M, air defence command post vehicle.

BTR-60 WS, command post vehicle.

BTR-60P maintenance assist vehicle.

BTR-60 SPAAG, Cuba has some with twin 30mm AAG.

BTR-60 ACVR M 1979(2), used by towed artillery units.

BTR-60PU command vehicle is BTR-60P with bows and tarpaulin cover, additional communications equipment and antenna. Also a command version of BTR-60PA with roof-mounted generator and 10m high radio antenna.

BTR-60PU-12 command vehicle is BTR-60PA with large stowage box on right side of hull, generator and telescopic mast.

BTR-60 ACRV, artillery command and reconnaissance vehicle.

BTR-60MS radio vehicle has High Ball (NATO code name) telescopic antenna.

BTR-60PB forward air control vehicle is BTR-60PB with armament removed from turret and port covered by plexiglass observation window. Additional communications equipment, generator normally installed on roof.

### STATUS

Production complete. In service with Afghanistan, Algeria, Angola, Armenia, Azerbaijan, Belarus, Botswana, Bulgaria, Cambodia, Cuba, Djibouti, Estonia, Ethiopia, Finland, Guinea, Guinea-Bissau, India, Iran, Iraq, North Korea, Laos, Libya, Lithuania, Mali, Moldova, Mongolia, Mozambique, Nicaragua, Peru, Romania (qvTAB-72), Russia, Somalia, Syria, Tajikistan, Turkey, Turkmenistan, Uganda, Vietnam, Yemen, Yugoslavia and Zambia.

### MANUFACTURER

Gorkiy Automobile Plant, Gorkiy, Russia.



*Above: BTR-60PB (8x8) (Richard Stickland)*

# Reumech OMC Rooikat Armoured Car (South Africa)

## KEY RECOGNITION FEATURES

- Almost horizontal glacis plate with driver's hatch in upper part in centre, horizontal hull top with raised engine compartment at the rear, hull rear vertical
- Turret is centre of vehicle with flat front and sides that slope slightly inwards. Long barrelled 76mm gun has thermal sleeve and fume extractor and overhangs front of vehicle
- Four large road wheels either side with larger gap between 2nd/3rd road wheels, upper part of hull slopes slightly inwards, hull escape hatch in either side of hull side between 2nd/3rd road wheels

## SPECIFICATIONS

|                         |                                                                                                   |
|-------------------------|---------------------------------------------------------------------------------------------------|
| Crew:                   | 4                                                                                                 |
| Configuration:          | 8x8                                                                                               |
| Armament:               | 1 x 76mm, 1 x 7.62mm MG (coaxial), 1 x 7.62mm MG (anti-aircraft), 2 x 4 smoke grenade dischargers |
| Ammunition:             | 48 x 76mm, 3,600 x 7.62mm                                                                         |
| Length with gun:        | 8.2m                                                                                              |
| Length hull:            | 7.09m                                                                                             |
| Width:                  | 2.9m                                                                                              |
| Height:                 | 2.8m                                                                                              |
| Ground clearance:       | 0.4m                                                                                              |
| Wheelbase:              | 1.55m + 2.032m + 1.625m                                                                           |
| Wdght,jwnbat^:          | 28,000kg                                                                                          |
| Power-to-weight ratio:  | JOJUij/tonne                                                                                      |
| Engine:                 | V-10 water-cooled diesel developing 563hp                                                         |
| Maximum road speed:     | 120km/hr                                                                                          |
| Range:                  | 1,000km                                                                                           |
| Fuel capacity:          | 540 lit                                                                                           |
| Fording:                | 1.5m                                                                                              |
| Vertical obstacle:      | 1m                                                                                                |
| Trench:                 | 2m (crawl speed), 1m (60km/hr)                                                                    |
| Gradient:               | 70%                                                                                               |
| Side slope:             | 30%                                                                                               |
| Armour:                 | Classified                                                                                        |
| Armour type:            | Steel                                                                                             |
| NBC system:             | Yes (BC only)                                                                                     |
| Night vision equipment: | YesJgassive)                                                                                      |

## DEVELOPMENT

The first production vehicles were completed in 1989, and the first unit was equipped with Rooikats in 1990. The turret is made by Lyttleton Engineering Works (LIW), part of the Denel Group of companies while Reumech OMC is the overall prime contractor and responsible for the chassis and systems integration.

The driver is seated at the front of the hull, turret in the centre and the powerpack at the rear. The commander and gunner are seated on the right of the turret with the loader on the left. The commander is provided with a raised cupola for improved all-round observation.

The stabilised 76mm gun fires APFSDS-T and HE-T rounds and has an elevation of +20° and a depression of -10°, with turret traverse being a full 360°. Turret traverse and weapon elevation/depression is all-electric with manual controls for emergency use. The Rooikat has a computerised fire control system fitted as standard. The gunner's day/night sight incorporates a laser rangefinder and the commander has a roof-mounted periscopic day sight.

The driver can select 8 x 8 or 8 x 4 drive with steering being power assisted on the front four wheels and if required the vehicle can lay its own smoke screen by injecting diesel fuel into the exhaust. A fire detection suppression system is fitted as standard.

## VARIANTS

105mm, prototypes of a 105mm version firing NATO standard ammunition have been built. This can be fitted with various types of fire control system to meet the users specific operational requirements.

**STATUS**

In production. In service with the South African Army.

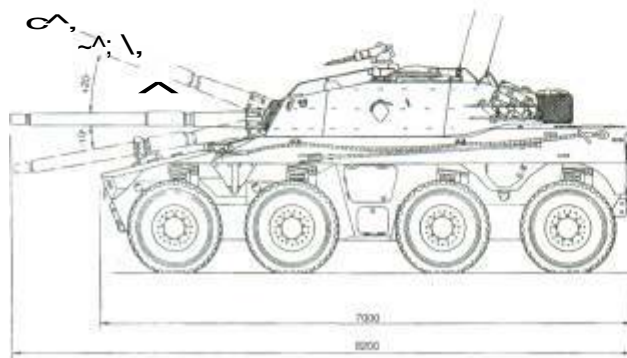
**MANUFACTURER**

Reumech OMC, Boksburg, Transvaal, South Africa.

*Below: 76mm Rooikat armoured car*

*Right: 76mm Rooikat armoured car*

*Below right: 76mm Rooikat armoured car*





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# **SELF-PROPELLED GUNS**



# NORINCO 155 mm PLZ45 self-propelled gun (China)

## KEY RECOGNITION FEATURES

- Hull has vertical sides with glacis plate sloping up to horizontal hull top which extends to hull rear which is vertical with no spades
- Large turret mounted at hull rear with vertical sides and rear, sides of turret slope towards front, no turret bustle. 155mm barrel has muzzle brake and fuze extractor
- Suspension either side has six road wheels with gap between 1st and 2nd/2nd and 3rd road wheels, drive sprocket at front, idler rear and three track return rollers

## SPECIFICATIONS

|                         |                                                    |
|-------------------------|----------------------------------------------------|
| Crew:                   | 5                                                  |
| Armament:               | 1 x 155mm howitzer,<br>1 x 12.7mm anti-aircraft MG |
| Ammunition:             | 30 x 155mm, 400 x 12.7mm                           |
| Length gun forwards:    | 10.15m                                             |
| Length hull:            | 6.1m                                               |
| Width without skirts:   | 3.23m                                              |
| Height with AA MG:      | 3.417m                                             |
| Ground clearance:       | 0.45m                                              |
| Weight, combat:         | 33,000kg                                           |
| Weight, empty:          | 31,000kg (estimate)                                |
| Power-to-weight ratio:  | 16.40hp/tonne                                      |
| Ground pressure:        | Not available                                      |
| Engine:                 | air cooled diesel developing 525hp                 |
| Maximum road speed:     | 56km/h                                             |
| Maximum road range:     | 450km                                              |
| Fuel capacity:          | Not available                                      |
| Fording:                | 1.2m                                               |
| Vertical obstacle:      | 0.7m                                               |
| Trench:                 | 2.7m                                               |
| Gradient:               | 58%                                                |
| Side slope:             | 47%                                                |
| Armour:                 | Classified                                         |
| Armour type:            | Steel                                              |
| NBC system:             | Yes                                                |
| Night vision equipment: | Yes (driver)                                       |

## DEVELOPMENT

The 155mm/45 calibre PLZ45 self-propelled howitzer was developed by NORINCO (China North Industries Corporation) in the late 1980s and was shown for the first time in public in

1988. In many respects it is very similar to the United States M109 series of 155mm self-propelled howitzers although the PLZ45 is slightly heavier and has a longer 155mm/45 calibre ordnance.

The layout of the PLZ45 is similar to the M109 with the driver being seated at the front of the vehicle on the left side with the engine compartment to his right with the remainder of the chassis being taken up by the fighting compartment.

The fully enclosed turret is mounted at the rear of the chassis and can be traversed through a full 360 degrees, the 155mm/45 calibre ordnance can be elevated from -3 to +72 degrees. Firing an Extended Range Full Bore - Base Bleed (ERFB-BB) projectile a maximum range of 39km can be achieved.

A 12.7mm machine gun is mounted on the turret roof for air defence purposes and when travelling the 155mm ordnance is in a travel locked pivoted at the hull front.

Standard equipment includes an auxiliary power unit, NBC system, explosion detection and suppression system, fire detection and suppression system, muzzle velocity measuring system, inertial direction finder and a gun display unit.

## VARIANTS

The only known variant is an ammunition resupply vehicle which has a similar chassis but is fitted with a raised superstructure at the rear and an hydraulic crane is mounted on the hull front.

## STATUS

Production as required. In service with China and Kuwait.

## MANUFACTURER

Chinese state factories

SELF-PROPELLED GUNS (WITH TURRETS)



**NORINCO 155mm PZL45 self-propelled gun**

# NORINCO 152mm Type 83 self-propelled gun (China)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with driver left and louvres right, horizontal hull top with vertical hull rear and large door opening right
- Large turret mounted rear with vertical sides and rear, long 152mm ordnance with large double baffle muzzle brake and fume extractor, 12.7mm AA MG on right side of roof
- Suspension each side has six road wheels with distinct gap between first/second, third/fourth and fifth/sixth, drive sprocket front, idler rear, three track-return rollers, no skirts

## SPECIFICATIONS

|                         |                                     |
|-------------------------|-------------------------------------|
| Crew:                   | 5                                   |
| Armament:               | 1 x 152mm, 1 x 12.7mm MG (AA)       |
| Ammunition:             | 30 x 152mm, 650 x 12.7mm            |
| Length gun forwards:    | 7.005m                              |
| Length hull:            | 6.405m                              |
| Width:                  | 3.236m                              |
| Height with AA MG:      | 3.502m                              |
| Height turret top:      | 2.686m                              |
| Ground clearance:       | 0.45m                               |
| Weight, combat:         | 30,000kg                            |
| Power-to-weight ratio:  | 17.33hp/tonne                       |
| Ground pressure:        | 0.68kg/cm <sup>2</sup>              |
| Engine:                 | Type 12150L diesel developing 520hp |
| Maximum road speed:     | 55km/hr                             |
| Maximum road range:     | 450km                               |
| Fuel capacity:          | 885 lit                             |
| Fording:                | 1.3m                                |
| Vertical obstacle:      | 0.7m                                |
| Trench:                 | 2.7m                                |
| Gradient:               | 60%                                 |
| Side slope:             | 40%                                 |
| Armour:                 | 10mm (maximum) (estimate)           |
| Armour type:            | Steel                               |
| NBC system:             | Not known                           |
| Night vision equipment: | Yes (infra-red for driver)          |

## DEVELOPMENT

The 152mm Type 83 was first seen in public in 1984 and is similar to Russian 152mm self-propelled gun/howitzer M-1973 (2S3) which entered service in the early 1970s.

Driver sits front left with engine to his right and whole of rear occupied by large turret. Turret has hatches in roof and large forward-opening door in each side. The Type 83 ordnance is based on Type 66 152mm towed weapon and fires HE projectile to maximum range of 17,230m. Turret traverses 360° and ordnance elevates from -5° to +63°. Semi-automatic loading device achieves rate of fire of four rounds a minute. In addition to 12.7mm MG mounted on turret roof for air defence, 7.62mm MG and Type 40 rocket launcher are carried internally.

## VARIANTS

Trench digger, chassis of Type 83 is used as a basis for a trench digging machine.

425mm mine-clearing rocket launcher, based on Type 83 chassis, carries two Type 762 mine clearing rockets.

130mm self-propelled gun, for trials purposes a Type 83 has had its 155mm ordnance replaced by a 130mm gun used in the 130mm Type 59 towed artillery system.

120mm self-propelled anti-tank gun type 1989, uses hull and turret of 152mm Type 83.

## STATUS

Production complete. In service with Chinese Army.

## MANUFACTURER

Chinese state arsenals.

SELF-PROPELLED GUNS (WITH TURRETS)



*Above: 152mm Type 83*

*Right: 152mm Type 83*



# ZTS Dana 152mm self-propelled gun (Former Czechoslovakia)

## KEY RECOGNITION FEATURES

- Cab front, turret centre, engine rear
- Eight road wheels, four front and four rear
- Turret higher than rest of vehicle with 152mm howitzer extending well over front of cab

## SPECIFICATIONS

|                         |                                                      |
|-------------------------|------------------------------------------------------|
| Crew:                   | 5                                                    |
| Configuration:          | 8x8                                                  |
| Armament:               | 1 x 152mm howitzer,<br>1 x 12.7mm MG                 |
| Ammunition:             | 60 x 152mm                                           |
| Length gun forward:     | 11.156m                                              |
| Length hull:            | 8.87m                                                |
| Width overall:          | 3.00m                                                |
| Height:                 | 2.85m (turret roof)                                  |
| Wheelbase:              | 1.65m + 2.97m + 1.45m                                |
| Weight, combat:         | 29,250kg                                             |
| Power-to-weight ratio:  | 11.79hp/tonne                                        |
| Engine:                 | Tatra 2-939-34 air-cooled diesel<br>developing 345hp |
| Maximum road speed:     | 80km/hr                                              |
| Maximum road range:     | 740km                                                |
| Fording:                | 1.4m                                                 |
| Gradient:               | 60o/o                                                |
| Side slope:             | 30%                                                  |
| Armour:                 | 12.7mm maximum (estimated)                           |
| NBC system:             | Yes                                                  |
| Night vision equipment: | Yes (driver only)                                    |

## DEVELOPMENT

The Dana 152mm was developed for the former Czechoslovak Army in the 1970s and was first seen in public in 1980. Its correct Czechoslovak designation is Vzor 77 self-propelled howitzer Dana. The chassis is based on a Tatra 815 (8 x 8) truck with extensive modifications including fully enclosed armoured cab at front, fully enclosed armoured turret in centre and engine moved to rear. Steering is power-assisted on front four

wheels with central tyre pressure regulation system fitted as standard, for driver to adjust tyre pressure while travelling.

The 152mm howitzer elevates from -4° to +70°, turret traverses 225° left and right. Turret traverse and weapon elevation hydraulic with manual controls for emergency. Three, hydraulic jacks are lowered to ground before firing, one at rear and one each side between second/third road wheels. Ordnance has single baffle muzzle brake but no fume extractor, with load assist device fitted as standard. The range of the 152mm howitzer is 18,700m using standard ammunition. Rate of fire is 3 rounds per minute for a period of 30 minutes. Ammunition includes APHE, HE, illuminating and smoke.

## VARIANTS

155mm Zuzana, latest model with many improvements including installation of 155mm/45 calibre ordnance which, when firing extended range full bore base bleed projectiles enables a range of 39,600m to be achieved. The 155mm Zuzana is now in service with Slovakia. Various 30mm and 35mm self-propelled anti-aircraft gun systems have been proposed or built, but none have entered production.

## STATUS

Production as required. In service with Czech Republic, Libya, Poland and Slovakia.

## MANUFACTURER

ZTS Dubnica nad Vahom, Slovakia



*Above: Zuzana 155mm*



*Above right; Dana  
152mm in firing  
position*

*Right: Zuzana 155mm*



# GIAT Industries 155mm GCT self-propelled gun (France)

## KEY RECOGNITION FEATURES

- Large fully enclosed flat-sided turret mounted centre of chassis, 155mm gun with double baffle muzzle brake overhanging front of vehicle
- Chassis identical to AMX-30 MBT's with five road wheels, idler front, drive sprocket rear, four track-return rollers. The upper part of the suspension is sometimes covered by a skirt

## SPECIFICATIONS

|                         |                                                                                                    |
|-------------------------|----------------------------------------------------------------------------------------------------|
| Crew:                   | 4                                                                                                  |
| Armament:               | 1 x 155mm gun, 1 x 7.62mm or 12.7mm AA MG, 2 x 2 smoke grenade dischargers                         |
| Ammunition:             | 42 x 155mm, 2,050 x 7.62mm or 800 x 12.7mm                                                         |
| Length gun forwards:    | 10.25m                                                                                             |
| Length hull:            | 6.7m                                                                                               |
| Width:                  | 3.15m                                                                                              |
| Height:                 | 3.25m (turret top)                                                                                 |
| Ground clearance:       | 0.42m                                                                                              |
| Weight, combat:         | 42,000kg                                                                                           |
| Weight, empty:          | 38,000kg                                                                                           |
| Power-to-weight ratio:  | 17.14hp/tonne                                                                                      |
| Engine:                 | Hispano-Suiza HS 110 12-cylinder water-cooled supercharged multi-fuel developing 720hp at 2,000rpm |
| Maximum road speed:     | 60km/hr                                                                                            |
| Maximum road range:     | 450km                                                                                              |
| Fuel capacity:          | 970 lit                                                                                            |
| Fording:                | 2.1m                                                                                               |
| Vertical obstacle:      | 0.93m (forwards), 0.48m (reverse)                                                                  |
| Trench:                 | 1.9m                                                                                               |
| Gradient:               | 60%                                                                                                |
| Side slope:             | 30%                                                                                                |
| Armour:                 | 20mm max (estimate)                                                                                |
| Armour type:            | Steel                                                                                              |
| NBC system:             | Yes                                                                                                |
| Night vision equipment: | Yes (driver only)                                                                                  |

## DEVELOPMENT

The 155mm GCT (Grande Cadence de Tir) was developed from 1969 to replace the 105mm Mk 61 and 155mm Mk F3 self-propelled guns in service with French Army. Production commenced at GIAT facility, Roanne, in 1977 and first production vehicles completed in 1978 for Saudi Arabia. By 1999 over 400 had been built for the home and export markets.

The 155mm gun has powered elevation from -4° to +66° with turret traverse powered through 360°. 155mm gun is fed by fully automatic loader that enables rate of fire of eight rounds a minute although it can also be loaded manually, in which case rate of fire is reduced to three rounds a minute. Maximum range using standard 155mm ME M107 projectile is 18,000m although other types of projectile can be fired including illuminating, smoke, extended range and anti-tank (mine).

## VARIANTS

No variants although various options in fire-control system are available. For trials purposes the GCT turret has been fitted onto the chassis of the Russian T-72 MBT. A 155mm/52 calibre version is under development for the French Army. The current Hispano-Suiza engine is to be replaced by a Renault E9 diesel engine.

## STATUS

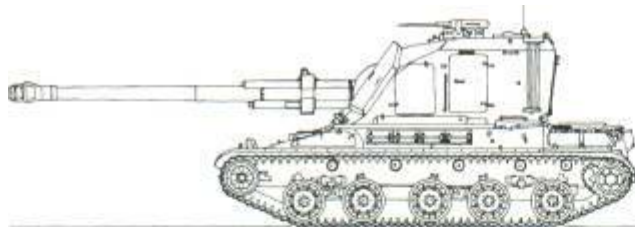
In production. In service with France, Iraq, Kuwait and Saudi Arabia.

## MANUFACTURER

GIAT Industries, Roanne, France.



## SELF-PROPELLED GUNS (WITH TURRETS)



**Above: GCT 155mm**

**Below: GCT 155mm turret  
on T-72 MBT chassis  
(Christopher F Foss)**



**Above right: GCT 155mm  
(Pierre Touzin)**

**Below right: GCT 155mm  
(Pierre Touzin)**



# Krauss-Maffei Wegmann 155mm PzH 2000 self-propelled gun (Germany)

---

## KEY RECOGNITION FEATURES

- Large chassis with well sloped glacis plate, vertical sides and rear. Turret mounted at rear with long barrel mounted in turret front that overhangs vehicle. Barrel is fitted with fume extractor two thirds back from the muzzle
- Turret overhangs rear, sides curve inwards to flat roof which is fitted with 7.62mm MG
- Suspension consists of seven road wheels with drive sprocket front and idler rear, upper part of suspension covered by wavy skirt

## SPECIFICATIONS

|                         |                                                   |
|-------------------------|---------------------------------------------------|
| Crew:                   | 5                                                 |
| Armament:               | 1 x 155mm, 1 x 7.62mm MG,<br>2 x 4 smoke grenades |
| Ammunition:             | 60 x 155mm, 1000 x 7.62mm                         |
| Length gun forward:     | 11.669m                                           |
| Length hull:            | 7.30m                                             |
| Width:                  | 3.58m                                             |
| Height:                 | 3.06m                                             |
| Ground clearance:       | 0.4m                                              |
| Weight, combat:         | 55,300kg                                          |
| Power-to-weight ratio:  | 18hp/tonne                                        |
| Engine:                 | MTU 881 diesel developing 1000hp                  |
| Maximum road speed:     | 60km/h                                            |
| Maximum road range:     | 420km                                             |
| Fuel capacity:          | Not available                                     |
| Fording:                | Not available                                     |
| Vertical obstacle:      | 1m                                                |
| Trench:                 | 3m                                                |
| Gradient:               | 50%                                               |
| Side slope:             | 25%                                               |
| Armour:                 | Classified                                        |
| Armour type:            | Steel (see text)                                  |
| NBC system:             | Yes                                               |
| Night vision equipment: | Yes                                               |

## DEVELOPMENT

A consortium led by the then Wegmann was selected to continue development of the Panzerhaubitze 2000 155mm self-propelled artillery system for the German army. It was accepted for service in 1995 and the initial order was for 185 vehicles.

The now Krauss-Maffei Wegmann is the prime contractor, responsible for the turret and systems integration with MaK responsible for the complete chassis. First production systems were handed over in mid-1998.

The driver is seated at the front right with the powerpack to his left and the fighting compartment to his rear. The 155mm/52 calibre gun elevates from -2.5° to +65° and the turret can traverse through 360°. An automatic loading system enables 8 rounds to be fired in 60 seconds. The charges are loaded manually. Maximum range is 40km with assisted projectiles or 30 km with conventional munitions.

The PzH 2000 can be fitted with reactive armour on the upper hull and turret roof to protect it from top attack weapons.

## VARIANTS

None

## STATUS

Production. In service with the German army.

## MANUFACTURER

Krauss-Maffei Wegmann AG, Kassel, Germany.

## SELF-PROPELLED GUNS (WITH TURRETS)



*Above: PzH 2000*

*Above right: PzH 2000*

*Right: PzH2000*



# OTOBREDA Palmaria 155mm self-propelled gun (Italy)

## KEY RECOGNITION FEATURES

- Large flat-sided turret mounted centre of hull with 155mm howitzer and double baffle muzzle brake and fume extractor
- When travelling, turret is normally traversed to rear and 155mm howitzer held in position by travelling lock at hull rear
- Driver at front, turret centre, engine and transmission rear. Suspension has seven road wheels, idler front, drive sprocket rear, track-return rollers. Upper part of suspension covered by skirts

## SPECIFICATIONS

|                              |                                                                                         |
|------------------------------|-----------------------------------------------------------------------------------------|
| Crew:                        | 5                                                                                       |
| Armament:                    | 1 x 155mm howitzer, 1 x 7.62mm AA MG, 2 x 4 smoke grenade dischargers                   |
| Ammunition:                  | 30 x 155mm, 1000 x 7.62mm                                                               |
| Length gun forward:          | 11.474m                                                                                 |
| Length hull:                 | 7.265m                                                                                  |
| Width:                       | 3.35m                                                                                   |
| Height:                      | 2.874m (without AA MG)                                                                  |
| Ground clearance:            | 0.4m                                                                                    |
| Weight, combat:              | 46,000kg                                                                                |
| Weight, empty:               | 43,000kg                                                                                |
| Power-to-weight ratio:       | 16.3hp/tonne                                                                            |
| Engine:                      | MTU MB 837 Ea-500 4-stroke, turbocharged, 8-cylinder multi-fuel diesel developing 750hp |
| Maximum road speed:          | 60km/hr                                                                                 |
| Maximum road range cruising: | 500km                                                                                   |
| Fuel capacity:               | 800 lit                                                                                 |
| Fording:                     | 1.2m (without preparation), 4m (with preparation)                                       |
| Vertical obstacle:           | 1m                                                                                      |
| Trench:                      | 3m                                                                                      |
| Gradient:                    | 60%                                                                                     |
| Side slope:                  | 30%                                                                                     |
| Armour:                      | Classified                                                                              |
| Armour type:                 | Hull steel, turret aluminium                                                            |
| NBC system:                  | Optional                                                                                |
| Night vision equipment:      | Optional                                                                                |

## DEVELOPMENT

The Palmaria 155mm was developed as a private venture by OTOBREDA specifically for export with first prototype completed in 1981 and first production vehicles the following year. It shares many automotive components with OTOBREDA OF-40 MBT, also developed for export, and in service with United Arab Emirates.

Driver and auxiliary power unit are at front, turret centre, engine and transmission rear. 155mm howitzer has powered elevation from -5° to +70° with powered turret traverse through 360°. It fires HE projectile to maximum range of 24,700m, and other types including HE rocket-assisted, illuminating, and smoke. Palmaria fires one round per 15 seconds using automatic loader.

## VARIANTS

No variants in service but its chassis has been fitted with twin 35mm ATAK turret and could be fitted with OTOBREDA 76mm anti-aircraft/helicopter turret. Argentina ordered 25 turrets for installation on lengthened TAM tank chassis, with final deliveries during 1986/87.

## STATUS

Production complete but can be resumed if required. In service with Libya and Nigeria, turret in service with Argentina on modified TAM chassis.

## MANUFACTURER

OTOBREDA, La Spezia, Italy.

## SELF-PROPELLED GUNS (WITH TURRETS)



*Above: Palmaria 155 mm*

*Right: Palmaria 155 mm*

*Below: Palmaria 155 mm*

*Below right: Palmaria  
155 mm*



# 152mm 2S19 self-propelled gun (Russia)

## KEY RECOGNITION FEATURES

- Well sloped glacis plate with turret in centre and powerpack at the rear
- Turret has vertical front, sides and rear with upper part curving inwards to flat roof on which a 12.7mm MG is mounted
- Chassis has six road wheels, idler front, drive sprocket at rear and track-return rollers, upper part of suspension is covered by skirt

## SPECIFICATIONS

|                         |                               |
|-------------------------|-------------------------------|
| Crew:                   | 5                             |
| Armament:               | 1 x 152mm, 1 x 12.7mm MG (AA) |
| Ammunition:             | 50 x 152mm, 300 x 12.7mm      |
| Length overall:         | 11.917m                       |
| Width:                  | 3.38m                         |
| Height to turret roof:  | 2.985m                        |
| Weight:                 | 42,000kg                      |
| Power-to-weight ratio:  | 20hp/tonne                    |
| Engine:                 | 840hp diesel                  |
| Maximum road speed:     | 60km/hr                       |
| Maximum road range:     | 500km                         |
| Fording:                | 1.2m                          |
| Vertical obstacle:      | 0.5m                          |
| Trench:                 | 2.8m                          |
| Gradient:               | 47°/o                         |
| Side slope:             | 36°                           |
| Armour:                 | Classified                    |
| Armour type:            | Steel/advanced                |
| NBC system:             | Yes                           |
| Night vision equipment: | Yes (passive)                 |

## DEVELOPMENT

The 152mm 2S19 was first revealed in 1990 and at that time was said to be in service in small numbers as the replacement for the older 152mm 2S3 self-propelled gun/howitzer. The 2S19 uses the same ordnance as the towed MSTA-A 2A65 152mm gun/howitzer which is referred to by NATO as the M1986, this being the year that it was first observed.

The 152mm 2S19 is based on a T-80 chassis that incorporates some components of the T-72 MBT, with the driver being seated at the front, fully enclosed turret in the centre and powerpack at the rear.

The 152mm ordnance is fitted with a muzzle brake and fume extractor and when travelling is held in position by a travel lock that is mounted on the glacis plate. The 152mm ordnance will fire a HE-FRAG projectile to a maximum range of 24,700m although using an extended range projectile a range of almost 40,000m can be achieved. The 152mm 2S19 can also fire the Krasnopol laser guided artillery projectile. Turret traverse is a full 360° with weapon elevation from -3° to +68°. An automatic loading system is fitted which enables a maximum rate of fire of eight rounds a minute to be achieved. A bustle-mounted APU is fitted to the turret to allow it to be used with the main engine switched off.

## VARIANTS

As far as it is known there are no variants of the 152mm 2S19 self-propelled artillery system. Russian sources have stated that a 155mm version is under development for export market.

## STATUS

Production. In service with Belarus, Russia and Ukraine.

## MANUFACTURER

Russian state factories.



## SELF-PROPELLED GUNS (WITH TURRETS)



**Above: 152mm 2S19 self-propelled gun**

*Above right: 152mm 2S19 self-propelled gun  
(Christopher F Foss)*

*Right: 152mm 2S19 self-propelled gun  
(Christopher F Foss)*





# 152mm self-propelled gun M1973 (2S3) (Russia)

## KEY RECOGNITION FEATURES

- Large turret with curved front mounted rear of hull, commander's cupola offset to left
- 152mm barrel overhangs chassis and has double baffle muzzle brake and fume extractor
- Suspension has six road wheels, drive sprocket front, idler rear, four track-return rollers. Distinct gap between first/second and second/third road wheels

## SPECIFICATIONS

|                         |                                                   |
|-------------------------|---------------------------------------------------|
| Crew:                   | 6 (4+2)                                           |
| Armament:               | 1 x 152mm howitzer,<br>1 x 7.62mm AA MG           |
| Ammunition:             | 46 x 152mm, 1500 x 7.62mm                         |
| Length qun forwards:    | 8.4m                                              |
| Length hull:            | 7.765m                                            |
| Width:                  | 3.25m                                             |
| Height:                 | 3.05m                                             |
| Ground clearance:       | 0.45m                                             |
| Weight, combat:         | 27,500kg                                          |
| Power-to-weight ratio:  | 17.33hp/tonne                                     |
| Ground pressure:        | 0.59kg/cm <sup>2</sup>                            |
| Engine:                 | V-59 V-12 water-cooled diesel<br>developing 520hp |
| Maximum road speed:     | 80km/hr                                           |
| Maximum road range:     | 500km                                             |
| Fuel capacity:          | 830 lit                                           |
| Fording:                | 1.0m                                              |
| Vertical obstacle:      | 0.7m                                              |
| Trench:                 | 3.0m                                              |
| Gradient:               | 600/0                                             |
| Side slope:             | 30%                                               |
| Armour:                 | 15mm (maximum turret),<br>20mm (maximum hull)     |
| Armour type:            | Steel                                             |
| NBC system:             | Yes                                               |
| Night vision equipment: | Yes (infra-red for driver and commander)          |

## DEVELOPMENT

The 152mm self-propelled gun/self-propelled gun M1973 (US

Army designation) entered service with Russian Army in the early 1970s and is similar to US 155mm M109 self-propelled gun. Its correct Russian designation is SO-152 but in Russian Army it is commonly known as Akatsiya (Acacia); its industrial number is 2S3. M1973 is based on chassis of SA-4 Ganef SAM system but has six rather than seven road wheels. Driver's and engine compartment at front with fully enclosed power-operated turret at far rear. 152.4mm gun/howitzer is based on towed D-20 gun/howitzer and mounted in power-operated turret with traverse of 360°, elevation from -4° to +60°.

The 152.4mm howitzer fires HE-FRAG projectile to maximum range of 18,500m or rocket-assisted projectile to maximum range of 24,000m, other types of projectile including HEAT-FS, AP-T, illuminating and smoke. Of the six-man crew, two are normally deployed as ammunition handlers at hull rear when in firing position. They feed projectiles and charges to the turret crew via the two circular hatches in the hull rear.

Late production versions, with some modifications, are designated the 2S3M and 2S3M1.

## VARIANTS

No known variants although chassis shares a number of components with SA-4 Ganef, 240mm self-propelled mortar M1975, and 152mm self-propelled gun 2S5.

## STATUS

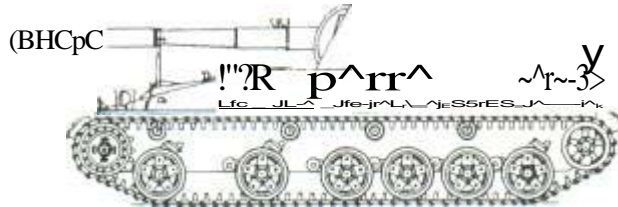
Production complete. In service with Algeria, Armenia, Belarus, Cuba, Georgia, Iraq, Kazakhstan, Libya, Russia, Syria, Turkmenistan, Ukraine, Uzbekistan and Vietnam.

## MANUFACTURER

Russian state arsenals.

## SELF-PROPELLED GUNS (WITH TURRETS)

*152mm self-propelled gun/self-propelled gun M1973 (2S3)*



*Right: 152mm self-propelled gun/self-propelled gun M1973 (2S3) with ordnance in travelling lock (Christopher F Foss)*



*Left: 152mm self-propelled gun/self-propelled gun M1973 (2S3) (Christopher F Foss)*

*Right: 152mm self-propelled gun/self-propelled gun M1973 (2S3) with ordnance in travelling lock*



# 122mm self-propelled gun M1974 (2S1) (Russia)

## KEY RECOGNITION FEATURES

- Low profile turret mounted at rear of long hull
- Suspension has seven large road wheels, drive sprocket front, idler rear, no track-return rollers
- 122mm howitzer does not overhang front of chassis, has double baffle muzzle brake and fume extractor

## SPECIFICATIONS

|                         |                                                                |
|-------------------------|----------------------------------------------------------------|
| Crew:                   | 4                                                              |
| Armament:               | 1 x 122mm howitzer                                             |
| Ammunition:             | 40 x 122mm                                                     |
| Length:                 | 7.26m                                                          |
| Width:                  | 2.85m                                                          |
| Height:                 | 2.732m                                                         |
| Ground clearance:       | 0.40m                                                          |
| Weight, combat:         | 15,700kg                                                       |
| Power-to-weight ratio:  | 19.1hp/tonne                                                   |
| Ground pressure:        | 0.49kg/cm <sup>2</sup>                                         |
| Engine:                 | YaMZ-238, V-8 water-cooled diesel developing 300hp at 2,100rpm |
| Maximum road speed:     | 61.5km/hr                                                      |
| Maximum water speed:    | 4.5km/hr                                                       |
| Maximum road range:     | 500km                                                          |
| Fuel capacity:          | 550 lit                                                        |
| Fording:                | Amphibious                                                     |
| Vertical obstacle:      | 0.70m                                                          |
| Trench:                 | 2.75m                                                          |
| Gradient:               | 77%                                                            |
| Side slope:             | 55%                                                            |
| Armour:                 | 20mm (max) (estimate)                                          |
| Armour type:            | Steel                                                          |
| NBC system:             | Yes                                                            |
| Night vision equipment: | Yes (infra-red for driver and commander)                       |

## DEVELOPMENT

The 122mm self-propelled gun M1974 (US Army designation) entered service with Russian Army in the early 1970s and was first seen in public during Polish Army parade in 1974. Correct

Russian designation is SO-122 but in Russian Army is commonly known as Gvozdika (Carnation); its industrial number is 2S1. It uses many automotive components of MT-LB multi-purpose tracked armoured vehicle including engine and suspension.

Driver's and engine compartment is at front left with fully enclosed power-operated turret towards rear. 122mm howitzer is modified version of ordnance used in D-30 towed howitzer and fires HE projectile to maximum range of 15,300m or HE rocket-assisted projectile to maximum range of 21,900m. Other 122mm projectiles fired by M1974 include HEAT-FS, illuminating and smoke. Turret traverses through 360° and 122mm howitzer elevates from -3° to +70°.

The M1974 is fully amphibious with very little preparation and once afloat is propelled by its tracks. An unusual feature is that its suspension can be adjusted to give different heights. Normal tracks are 400mm wide but 670mm wide tracks can be fitted for snow or swamp.

## VARIANTS

Artillery Command and Reconnaissance Vehicles. These are known as the MT-LBus (1V12 series) by the Russian Army and are based on the MT-LB chassis.

1V13 is called M1974-1 by NATO and is deputy battery commander's vehicle.

1V14 is called M1974-2A by NATO and is the battery commander's vehicle.

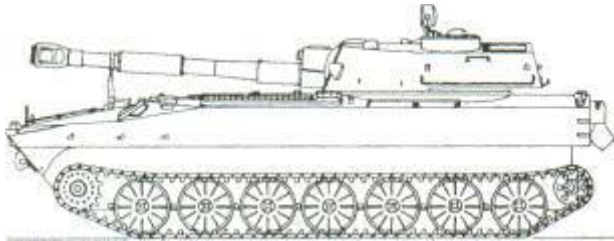
1V15 is called M1974-2B by NATO and is the battalion commander's vehicle.

1V16 is called the M1974-3 by NATO and is the deputy battalion commander's vehicle.

1V21/22/23/24 and 25 are air defence management vehicles.

MT-LBus is a jamming vehicle on M1974 chassis.

## SELF-PROPELLED GUNS (WITH TURRETS)



Dog Ear radar vehicle used by air defence units is on M1974 series chassis.

MI979 mine-clearing vehicle has turret-like superstructure with three rockets fired across minefield towing hose filled with explosive which detonates on ground.

RKhM chemical reconnaissance vehicle has raised superstructure on which is mounted 7.62mm MG cupola with boxes for dispensing pennants showing path through contaminated areas.

Da1 NBC Reconnaissance Vehicle.

Zoopark-1 artillery locating radar system.

### STATUS

Production complete. In service with Algeria, Angola, Armenia, Azerbaijan, Belarus, Bulgaria, Croatia, Cuba, Czech Republic, Ethiopia, Finland, Hungary, Iran, Iraq, Kazakhstan, Libya, Poland, Romania, Russia, Slovakia, Syria, Ukraine, Uzbekistan, Yemen and Yugoslavia.

### MANUFACTURER

Bulgarian, Polish and Russian state factories.

**Above:**  
**122mm**  
**M1974 (2S1)**



**Above right:**  
**122mm**  
**M1974 (2S1)**



**Right:**  
**122mm**  
**M1974 <2S1)**

# LIW G6 155mm self-propelled gun (South Africa)

## KEY RECOGNITION FEATURES

- Three large road wheels each side with distinctive gap between first and second road wheel, driver's compartment at very front of hull in centre with windscreens to his front and sides
- Large turret at rear with raised commander's cupola on right side, front and sides of turret slope slightly inwards, 155mm ordnance has long barrel with large single baffle muzzle brake and fume extractor. When travelling ordnance is horizontal and held in travel lock
- Hull front is pointed and hull rear vertical, louvres in upper sides of hull between first and second road wheel station

## SPECIFICATIONS

|                         |                                                                   |
|-------------------------|-------------------------------------------------------------------|
| Crew:                   | 6                                                                 |
| Configuration:          | 6x6                                                               |
| Armament:               | 1 x 155mm, 1 x 12.7mm MG (AA),<br>2 x 4 smoke grenade dischargers |
| Ammunition:             | 45 x 155mm, 1,000 x 12.7mm                                        |
| Length gun forwards:    | 10.335m                                                           |
| Length hull:            | 9.2m                                                              |
| Width:                  | 3.4m                                                              |
| Height:                 | 3.8m (including MG), 3.3m (turret top)                            |
| Ground clearance:       | 0.45m                                                             |
| Weight, combat:         | 47,000kg                                                          |
| Weight, empty:          | 42,500kg                                                          |
| Power-to-weight ratio:  | 11.17hp/tonne                                                     |
| Engine:                 | Air-cooled diesel developing 518hp                                |
| Maximum road speed:     | 90km/hr                                                           |
| Maximum road range:     | 700km                                                             |
| Fuel capacity:          | 700 lit                                                           |
| Fording:                | 1m                                                                |
| Vertical obstacle:      | 0.5m                                                              |
| Trench:                 | 1m                                                                |
| Gradient:               | 40%                                                               |
| Side slope:             | 30%                                                               |
| Armour:                 | 23mm (maximum)                                                    |
| Armour type:            | Steel                                                             |
| NBC system:             | Yes (BC only)                                                     |
| Night vision equipment: | Yes (passive)                                                     |

## DEVELOPMENT

The 155mm G6 self-propelled howitzer was developed by LIW to meet the requirements of the South African Artillery Corps for a highly mobile artillery system capable of operating over

very rough terrain. The first prototype completed in 1981 was followed by a series of additional prototype and pre-production vehicles with the first production vehicles being completed in 1988. Prime contractor for the G6 is LIW, part of the Denel Group who also manufactures the 155mm G5 towed artillery system which has identical ballistic characteristics to the G6 as they both have a 155mm/45 calibre ordnance. Chassis of the G6 is manufactured by Reumech OMC.

The driver is seated at the very front of the vehicle in the centre, to his rear is the powerpack with the turret being mounted at the very rear. Turret traverse is 180°, although only 90° is used with weapon elevation being from -5° to +75°. Firing Extended Range Full Bore - Base Bleed (ERFB-BB) projectiles a maximum range of 39,000m can be achieved. A flick rammer is provided to obtain higher rates of fire. The G6 is normally supported in action by another vehicle which carries additional projectiles and charges. When deployed in the firing position, four stabilisers are lowered to the ground, one either side of the hull between the first and second road wheels and two at the rear.

Standard equipment includes an APU, air conditioning system, fire detection and suppression system, computerised fire control system, powered steering and a central tyre pressure regulation system.

## VARIANTS

Chassis has been proposed for other applications including being fitted with Marconi Marine, Land and Naval Systems, Marksman twin 35mm air defence turret. LIW have developed the T6 155mm/45 calibre turret from the G6 and this has been fitted to T-72 MBT for trials.

## SELF-PROPELLED GUNS (WITH TURRETS)

### STATUS

In service with Oman, South Africa and the United Arab Emirates.

### MANUFACTURER

LIW, Pretoria, South Africa (but see text).

*Right: LIW 155mm G6*

*Far right: LIW 155mm G6*

*Below right: LIW 155mm G6*

*Below: LIW 155mm G6  
(Christopher F Foss)*



# Bofors 155mm Bandkanon 1A self-propelled gun (Sweden)

## KEY RECOGNITION FEATURES

- 155mm gun is mounted in fully enclosed turret at rear of

and ammunition handling system protruding well to rear

- 155mm gun with pepperpot muzzle brake extends over front of vehicle, normally held in position by travelling lock

- Suspension each side has six large road wheels, last one acting as idler, drive sprocket front, no track-return rollers

## SPECIFICATIONS

|                         |                                                                                                                               |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Crew:                   | 5                                                                                                                             |
| Armament:               | 1 x 155mm gun, 1 x 7.62mm AA MG                                                                                               |
| Ammunition:             | 14 x 155mm                                                                                                                    |
| Length hull:            | 6.55m                                                                                                                         |
| Width:                  | 3.37m                                                                                                                         |
| Height:                 | 3.85m (with AA MG);<br>3.25m (turret top)                                                                                     |
| Ground clearance:       | 0.37m                                                                                                                         |
| Weight, combat:         | 53,000kg                                                                                                                      |
| Power-to-weight ratio:  | 10.18hp/tonne                                                                                                                 |
| Ground pressure:        | 0.9kg/cm <sup>2</sup>                                                                                                         |
| Engine:                 | Detroit-diesel model 6V-53T developing 290hp at 2,800rpm and Boeing Model 502/10MA gas turbine developing 300shp at 38,000rpm |
| Maximum road speed:     | 28km/hr                                                                                                                       |
| Maximum road range:     | 230km                                                                                                                         |
| Fuel capacity:          | 1,445 lit                                                                                                                     |
| Fording:                | 1m                                                                                                                            |
| Vertical obstacle:      | 0.95m                                                                                                                         |
| Trench:                 | 2m                                                                                                                            |
| Gradient:               | 60%                                                                                                                           |
| Side slope:             | 30%                                                                                                                           |
| Armour:                 | 20mm (maximum)                                                                                                                |
| Armour type:            | Steel                                                                                                                         |
| NBC system:             | No                                                                                                                            |
| Night vision equipment: | Yes (driver only)                                                                                                             |

m^mm



**Above:** 155mm Bandkanon 1A in travelling configuration

## DEVELOPMENT

The 155mm Bandkanon 1A was developed by Bofors in the late 1950s for the Swedish army and was produced in very limited numbers during 1967-68. It uses many automotive components of the Bofors S-tank. Engine and transmission are mounted at front of vehicle with fully enclosed four-man turret at rear. 155mm gun has manual elevation from -3° to +40° with powered elevation from +2° to +38°. Traverse is manual 15° left and right at 0° elevation and above, and 15° left and 4° right below 0° depression. The 155mm gun is fully automatic, fed by magazine holding 14 rounds in two layers of seven at rear of turret, and fires HE projectile to maximum range of 25,600m.

More recently these systems have been upgraded with the Rolls-Royce diesel being replaced by a Detroit Diesel 6V-53T



developing 290hp coupled to a new automatic transmission developed and produced by Bofors. The latest upgrade includes the installation of the Honeywell MAPS and gun interfaced with the new Swedish Army SKER fire control system.

### **STATUS**

Production complete. In service with Swedish Army only.

### **MANUFACTURER**

Bofors Weapon Systems,  
Karlskoga, Sweden.



*Right: 155mm  
Bandkanon 1A in  
travelling configuration*

# Marconi Marine, Land and Naval Systems, 155mm AS90 self-propelled gun (UK)

## KEY RECOGNITION FEATURES

- well sloped glacis plate with driver on left and raised engine compartment to his right. Turret at very rear of chassis with sloped front, sloped sides and vertical rear
- 155mm ordnance has double baffle muzzle brake and when in travelling lock projects over front of hull. Travel lock is pivoted at very front of hull and lays back on glacis plate when not required
- Chassis has vertical sides and rear with each side having six dual rubber tyred road wheels, drive sprocket at front, idler at rear and three track-return rollers

## SPECIFICATIONS

|                         |                                                                       |
|-------------------------|-----------------------------------------------------------------------|
| Crew:                   | 5                                                                     |
| Armament:               | 1 x 155mm, 1 x 12.7mm MG (AA),<br>2 x 5 smoke grenade dischargers     |
| Ammunition:             | 48 x 155mm, 1,000 x 12.7mm                                            |
| Length gun forwards:    | 9.90m                                                                 |
| Length hull:            | 7.20m                                                                 |
| Width:                  | 3.40m                                                                 |
| Height overall:         | 3m                                                                    |
| Ground clearance:       | 0.41m                                                                 |
| Weight, combat:         | ~5,000k2                                                              |
| Power-to-weight ratio:  | 14.66hp/tonne                                                         |
| Ground pressure:        | 0.90kg/cm <sup>2</sup>                                                |
| Engine:                 | Cummins VTA 903T 660T-660 V-8<br>diesel developing 660bhp at 2,800rpm |
| Maximum road speed:     | 55km/hr                                                               |
| Maximum road range:     | 370km                                                                 |
| Fuel capacity:          | 750 lit                                                               |
| Fording:                | 1.5m                                                                  |
| Vertical obstacle:      | 0.88m                                                                 |
| Trench:                 | 2.8m                                                                  |
| Gradient:               | 60%                                                                   |
| Side slope:             | 25%                                                                   |
| Armour:                 | 17mm (max)                                                            |
| Armour type:            | Steel                                                                 |
| NBC system:             | Yes                                                                   |
| Night vision equipment: | Yes (passive)                                                         |

## DEVELOPMENT

In 1981 Vickers Shipbuilding and Engineering (VSEL) (today called Marconi Marine, Land and Naval Systems) built the prototype of a 155mm artillery turret called the GBT 155. The company then started development work, as a private venture, on a brand new complete 155mm self-propelled artillery system which was called the AS90, the first of two prototypes of this were completed in 1986. The AS90 was subsequently entered in the British Army's Abbot Replacement Competition and in 1989 AS90 was selected and a contract placed for 1 79 systems, with final deliveries being made to the British Army early in 1995. AS90 has replaced all other self-propelled guns in the British Army.

The driver is seated at the front left with the powerpack to his right, and the turret at the rear. Access to the turret is via a large door in the chassis rear. Turret traverse is a full 360° with weapon elevation from -5° to +70°. The 155mm 39 calibre ordnance has a maximum range of 24,700m using standard ammunition or over 30,000m using extended range full bore ammunition. Of the 48 projectiles carried, 31 are stowed in the turret bustle magazine. A burst rate of three rounds in 10 seconds can be achieved with sustained rate of fire being 2 rounds a minute.

The suspension of the AS90 is of the hydropneumatic type and standard equipment on British Army systems includes muzzle velocity measuring equipment, land navigation system and a fully automatic gun laying capability.

## VARIANTS

There are no variants of the 155mm AS90 although the company proposed the chassis for a wide range of other systems including recovery, maintenance and flatbed. Although

## SELF-PROPELLED GUNS (WITH TURRETS)

British Army AS90s have a 39 calibre barrel but part of the fleet will now be fitted with 155mm/52 calibre barrel. AS90 turret has also been fitted onto T-72 MBT chassis for trials in India.

### STATUS

Production complete but can be resumed. In service with British Army.

### MANUFACTURER

Marconi Marine, Land and Naval Systems,  
Barrow-in-Furness, UK

*Right: AS90  
155mm self-  
propelled  
gun*

*Below right:  
155mm self-  
propelled  
gun*

*Below:  
155mm self-  
propelled  
gun*



# United Defense, LP, M109A2 155mm self-propelled gun (USA)

## KEY RECOGNITION FEATURES

- Hull has vertical sides with glacis plate sloping up to horizontal hull top which extends to rear. Spade mounted each side of rear hull door
- Large turret-mounted rear with curved front, vertical sides and rear. Long barrel with fume extractor and double baffle muzzle brake that overhangs front of vehicle when travelling. Roof-mounted 12.7mm AA MG
- Suspension has seven small road wheels, drive sprocket front, idler rear, no track-return rollers

## SPECIFICATIONS

|                         |                                                                                                          |
|-------------------------|----------------------------------------------------------------------------------------------------------|
| Crew:                   | 6                                                                                                        |
| Armament:               | 1 x 155mm howitzer,<br>1 x 12.7mm MG                                                                     |
| Ammunition:             | 36 x 155mm, 500 x 12.7mm                                                                                 |
| Length gun forwards:    | 9.12m                                                                                                    |
| Length hull:            | 6.19m                                                                                                    |
| Width:                  | 3.15m                                                                                                    |
| Height:                 | 3.28m (including AA MG)                                                                                  |
| Height:                 | 2.8m (reduced)                                                                                           |
| Ground clearance:       | 0.46m                                                                                                    |
| Weight, combat:         | 24,948kg                                                                                                 |
| Weight, empty:          | 21,110kg                                                                                                 |
| Power-to-weight ratio:  | 16.23hp/tonne                                                                                            |
| Ground pressure:        | 0.85kg/cm <sup>2</sup>                                                                                   |
| Engine:                 | Detroit Diesel Model 8V-71T, turbocharged, liquid-cooled 8-cylinder diesel developing 405bhp at 2,300rpm |
| Maximum road speed:     | 56.3km/hr                                                                                                |
| Maximum road range:     | 349km                                                                                                    |
| Fuel capacity:          | 511 lit                                                                                                  |
| Fording:                | 1.07m                                                                                                    |
| Vertical obstacle:      | 0.53m                                                                                                    |
| Trench:                 | 1.83m                                                                                                    |
| Gradient:               | 60%                                                                                                      |
| Side slope:             | 40%                                                                                                      |
| Armour:                 | Classified                                                                                               |
| Armour type:            | Aluminium                                                                                                |
| NBC system:             | Optional                                                                                                 |
| Night vision equipment: | Optional (infra-red or passive for driver)                                                               |

## DEVELOPMENT

M109 series was developed in the 1950s and shares common chassis with M108 105mm self-propelled howitzer. First production vehicles completed in 1962 and production of latest M109 continues with over 4000 built so far.

The driver sits front left, engine compartment to his right and large turret at hull rear. Turret traverses through 360° and 155mm howitzer elevates from -3° to +75°. Ammunition is separate loading type with 34 projectiles and charges carried, plus two Copperhead Cannon Launched Guided Projectiles. Following types of projectile fired by M109A2: HE (maximum range 18,100m), Improved Conventional Munition, Remote • Anti-Armor Mine system (RAAMS), Area Denial Artillery Munition (ADAM), High Explosive Rocket Assist (HERA), illuminating, smoke, high explosive (grenade), and numerous other types.

## VARIANTS

M109, first model to enter service has very short barrel, double baffle muzzle brake and large fume extractor to immediate rear, maximum range 14,600m.

M109A1 is M109 with new and longer barrel and other improvements, maximum range (standard HE) 18,100m, as M109A2 which was built with these and other improvements.

M109A3 is an upgraded M109A1 with a number of modifications including new gun mount and improved RAM-D.

M109A4 is an upgraded M109A2 or M109A3 with improvements to NBC system etc.

M109A5 is upgraded M109A4.

M109A6 is the latest production model for US Army and is also referred to as the Paladin with first production vehicles completed in 1992. Many improvements including new turret

## SELF-PROPELLED GUNS (WITH TURRETS)

with longer barrel ordnance, automatic fire control system, upgraded suspension and improved armour.  
M109A3G is German Army M109G with many improvements

including new ordnance.

M109L, Italy has fitted its M109s with ordnance of FH-70,

these are known as M109L

M109AL is Israeli version of M109.

M109 Taiwan uses M108/M109 chassis but without turret and has 155mm weapon in open mount. Short barrel version uses ordnance of towed M114 and more recent version has new and much longer ordnance.

M109L47, modified M109 for UAE with 47 calibre barrel

Swiss M109s are now getting 47 calibre barrel.

M992 Field Artillery Ammunition Support Vehicle, in service with Saudi Arabia, Spain, Thailand and the United States is M109 chassis with fully enclosed rear hull to carry 155mm ammunition and feeds this to M109 self-propelled gun when in firing position.

FDC, Fire Detection Centre or Fire Control Centre, uses same chassis and hull as M992. Greece and Taiwan.

### STATUS

In production. In service with Austria, Belgium, Canada, Denmark, Egypt, Ethiopia, Germany, Greece, Iran, Israel, Italy, Jordan, South Korea, Kuwait, Morocco, Netherlands, Norway, Pakistan, Peru, Portugal, Saudi Arabia, Spain, Switzerland, Taiwan, Tunisia, UAE, USA and Venezuela.

### MANUFACTURER

United Defense, LP, York, Pennsylvania, USA.



*Above:  
M109A6  
Paladin*



*Right:  
M109A2 of  
OS Army*

# Glossary

|          |                                                          |           |                                                   |                    |                                                         |       |                                                                                       |
|----------|----------------------------------------------------------|-----------|---------------------------------------------------|--------------------|---------------------------------------------------------|-------|---------------------------------------------------------------------------------------|
| AA       | anti-aircraft                                            | CEV       | combat engineer vehicle                           | HVAP-DS-T          | high velocity armour-piercing discarding sabot - tracer | SATCP | Système Anti-aérien a Tres Courtee                                                    |
| AAAV     | armored amphibious assault vehicle                       | CFE       | Conventional Forces Europe                        |                    |                                                         | shp   | shaft horse power                                                                     |
| ACRV     | armored command and reconnaissance vehicle               | CFV       | Cavalry Fighting Vehicle                          | HVAP-T             | high velocity armour-piercing tracer                    | SPAAG | Self-propelled anti-aircraft gun                                                      |
| ADAM     | Area Denial Artillery Munition                           | CLOP      | Cannon Launched Guided Projectile                 | IAFV               | infantry armoured fighting vehicle                      | SPAAM | self-propelled anti-aircraft missile                                                  |
| ADATS    | Air Defence Anti-tank System                             | COV       | Counter Obstacle Vehicle                          | ICM                | improved conventional munition                          | SPATG | self-propelled anti-tank gun                                                          |
| ALV      | armoured engineer vehicle                                | CVR(T)    | Combat Vehicle Reconnaissance (Tracked)           | ICV                | infantry combat vehicle                                 | SLEP  | service life extension programme                                                      |
| AFSV     | Armoured Fire Support Vehicle                            | CVR(W)    | Combat Vehicle Reconnaissance (Wheeled)           | IDF                | Israel Defence Forces                                   | Y     | self-propelled                                                                        |
| AIFV     | Armoured Infantry Fighting Vehicle                       | EBG       | Engin Blinde Genie                                | IFV                | infantry fighting vehicle                               | SPG   | self-propelled gun                                                                    |
| AMI      | Automitrailleuse Legere (light armoured car)             | EBR       | Engin Blinde de Reconnaissance                    | IR                 | infra-red                                               | SPH   | self-propelled howitzer                                                               |
| AMX      | Atelier de Construction d'Issy-les-Moulineaux            | ERA       | Explosive Reactive Armour                         | IS                 | internal security                                       | SPM   | self-propelled mortar                                                                 |
| AC       | armour piercing                                          | ERC       | Engin de Reconnaissance Cannon                    | IIV                | Improved TOW Vehicle                                    | TADDS | Target Alert Display Data Set                                                         |
| APC      | armoured personnel carrier                               | FAASV     | Field Artillery Ammunition Support Vehicle        | KIFV               | Korean Infantry Fighting Vehicle                        | TAM   | Tanque Argentine Mediano                                                              |
| APC-1    | armour-piercing capped - tracer                          | FCC       | Fire Command Centre                               | kg/cm <sup>2</sup> | kilogram per centimetre square                          | TD    | tank destroyer                                                                        |
| APDS     | armour-piercing discarding sabot                         | PCS       | Fire Control System                               | km/hr              | kilometre per hour                                      | TEL   | transporter, erector, launcher                                                        |
| APDS-T   | armour-piercing discarding sabot - tracer                | FDC       | Fire Direction Centre                             | IAV                | Light Armoured Vehicle                                  | TELAR | transporter, erector, launcher and radar                                              |
| APERS-T  | anti-personnel - tracer                                  | FISTV     | Fire Support Team Vehicle                         | lit                | litres                                                  | TLS   | Tank Laser Sight                                                                      |
| APFSDS   | armour-piercing fin-stabilised discarding sabot          | FUR       | Forward Looking Infra-red                         | LLLTV              | low-light level television                              | TOGS  | Thermal Observation and Gunnery System                                                |
| APFSDS-T | armour-piercing fin-stabilised discarding sabot - tracer | GIAT      | Groupeement Industriel des Armements Terrestres   | LVT                | landing vehicle tracked                                 | TOW   | Tube-launched, Optically-tracked, Wire-guided television                              |
| APHE     | armour-piercing high explosive                           | GLLD      | Ground Laser Locator Designator                   | LVTR               | landing vehicle tracked recovery                        | VARRV | Vickers Armoured Repair and Recovery Vehicle                                          |
| APSE-1   | armour piercing secondary effect - tracer                | HAV       | heavy assault bridge                              | m                  | metre                                                   | VAB   | Vehicule de l'Avant Blinde (front armoured car)                                       |
| AI-1     | armour piercing incendiary - tracer                      | HB        | heavy barrel                                      | mm                 | millimetre                                              | VAB   | Vickers Armoured Bridgelayar                                                          |
| AI'-I    | armour piercing - tracer                                 | HCT       | HOT Compact Turret                                | MBT                | main battle tank                                        | VBC   | Vehicule Blinde Combat                                                                |
| ARE      | Atelier de Construction Roanne                           | HE        | high explosive                                    | MEWS               | mobile electronic warfare system                        | VL    | Vehicule Blinde Leger                                                                 |
| ARHV     | Armoured Repair and Recovery Vehicle                     | HE-T      | high explosive - tracer                           | MG                 | machine gun                                             | VCI   | Vehicule de Combat d'Infanterie; Vehiculo combate infantria (infantry combat vehicle) |
| AIR      | automotive test rig                                      | HEAT      | high explosive anti-tank                          | MICV               | mechanised infantry combat vehicle                      | VCR   | variable compression ratio                                                            |
| AIGW     | anti-tank guided weapon                                  | HEAT-FS   | high explosive anti-tank fin-stabilised           | MILAN              | Missile d'Infanterie Leger Antichar                     | VCR   | Vehicule de Combat a Roues                                                            |
| AIS      | air-transportable towed system                           | HEAT-T-MP | high explosive anti-tank - tracer - multi-purpose | MLRS               | Multiple Launch Rocket System                           | VCTP  | Vehiculo de Combate Transporte de Personal                                            |
| AViP     | Armoured Vehicle General Purpose                         | HE-FS     | high explosive - fin stabilised                   | NBC                | nuclear, biological, chemical                           | VCG   | Vehicule de Combat du Genie                                                           |
| AVLB     | armoured vehicle launched bridge                         | HE-FRAG   | high explosive fragmentation                      | NVE                | Night Vision Equipment                                  | VDA   | Vehicule de Defense Anti-aerienne                                                     |
| AVRI     | Armoured Vehicle Royal Engineers                         | HE-FRAGFS | high explosive fragmentation - fin stabilised     | RP                 | rocket propelled                                        | VEC   | Vehiculo de Exploracion de Caballerie                                                 |
| BARV     | Beach Armoured Recovery Vehicle                          | HEI-T     | high explosive incendiary - tracer                | pto                | power take-off                                          | VSEL  | Vickers Shipbuilding and Engineering Ltd                                              |
| bhp      | brakehorsepower                                          | HESH      | high explosive practice - tracer                  | RAMS               | Remote Anti-armor Mine System                           | WAPC  | Wheeled Armoured Personnel Carrier                                                    |
| HIR      | Blindado Lingo de Ruedas                                 | HEP       | high explosive plastic                            | RMG                | ranging machine gun                                     | WFSV  | Wheeled Fire Support Vehicle                                                          |
| BMR      | Blindso Mediodie Ruedas                                  | HE-T      | high explosive - tracer                           | ROKIT              | Republic of Korea Indigenous Tank                       | WMRV  | Wheeled Maintenance Recovery Vehicle                                                  |
| CAF      | Canadian Armed Forces                                    | HERA      | high explosive rocket assist                      | RO                 | Royal Ordnance                                          |       |                                                                                       |
|          |                                                          | hp        | horsepower                                        | rpm                | rounds per minute or revolutions per minute             |       |                                                                                       |
|          |                                                          |           |                                                   | SAM                | Surface-to-Air Missile                                  |       |                                                                                       |
|          |                                                          |           |                                                   | SANTAL             | Système Anti-aerien Leger                               |       |                                                                                       |



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