

## **WHEELED SELF-PROPELLED ANTIAIRCRAFT**

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**Shorland S53**

Notes: This is a version of the Shorland Mk3 (S52) armored car carrying a triple launcher for Blowpipe, Javelin, and Starburst SAMs. The missiles are mounted on the roof and fired by a gunner standing up in a hatchway. The system is simple and lightweight, and the missile launchers are standard lightweight multiple launchers (LMLs) and can be dismantled from the vehicle. As with the Shorland Mk 3, the engine used is a gasoline-powered 91-horsepower Rover truck engine. The mount for the SAMs does not allow any defensive armament to be carried other than the crew's small arms, grenades, or antitank rockets. The interior is largely taken up with racks and reloads for the SAM launchers.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$116,396	G, A	300 kg	3.36 tons	3	3	Passive IR (G)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
182/32	50/9	128	50	CiH	W(3)	TF1 TS1 TR1 HF2 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	3xBlowpipe/Javelin/Starburst SAM launchers	15xBlowpipe/Javelin/Starburst SAMs

**LAV-AD**

Notes: The LAV-AD is the ultimate design that came from a 1987 contract from the US Army for a LAV with air defense capabilities. It is equipped with a turret, which has a brace of eight fire-and-forget Stinger SAMs, as well as a 30mm Gatling gun that is married to a computerized fire control system with a laser rangefinder. The LAV-AD progressed and developed until 1992, when the design reached its final stage. It was first chosen, after a series of tests, by the US Marine Corps to meet their standards. The turret is capable to be fitted on not only the LAV-25 frame, but also the M-113 and M-2 Bradley frames.

Twilight 2000 Notes: The LAV-AD was in production when the US entered the war and elements of the 4th Marine Division, 23rd Regiment, and the 31st Marine Expeditionary Unit were equipped with the LAV-AD. The US Army and Air Force began integrating the LAV-AD into service by the time of the November nuclear strikes. It is not known, however, which units of the US Army and Air Force received these models before the strikes began.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$311,730	D, A	400 kg	13 tons	3	6	Passive IR	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
144/58	36/15/4	300	84	Trtd	W(6)	TF6 TS4 TR4 HF6 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
+3	Good	8xStinger Launchers, 30mm-3 Autocannon, MAG	16xStinger SAMs, 2000x30mm, 750x7.62mm

**LAV-AD II**

Notes: This version of the LAV-AD is in common use by Canadian and various European forces, especially Swiss, Austrian, Belgian, and Dutch armies. The basic chassis is the same, but the turret is a Blazer turret modified to carry Mistral missiles, upgraded fire control and night vision, and an autocannon. It retains the shoot and scoot capability of the standard LAV-AD, but is decidedly more deadly.

Twilight 2000 Notes: The US Marines tested this version, but all but four were returned to the Canadians before the Twilight War; those four were deployed to Norway, and later the three survivors were sent to Poland. Other users of the LAV-AD II included the Australians and New Zealanders; the Australians credit them with a 90% kill rate once the target came within range.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$319,274	D, A	400 kg	12.9 tons	3	6	Passive IR, Image Intensification, FLIR, Radar	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
142/56	36/14/4	300	83	Trtd	W(6)	TF6 TS4 TR4 HF6 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
+4	Good	4xMistral Launchers, 30mm-3 Bushmaster II, MAG	8xMistral SAMs, 2000x30mm, 750x7.62mm

**BK-1060**

The BK-1060 is the SPAAG part of the new ZBL09 family of light armored vehicles. It appears to have a turret derived from the Italian OTOBreda 76mm M113-based SPAAG, but the gun used is a derivative of the PG99 35mm gun (with longer barrels and different muzzle brakes; I have called this the PG99-1, though this is not an official designation), which rapidly seems to be becoming the standard AAA caliber for Chinese forces; this turret is even mounted on PLAN ships. The PLA seems to be using the ZBL09 series as the core of a new type of rapid-deployment division currently undergoing testing by the PLA.

The fire control system is sort of a melding between the Type 09 and the LD-2000, having the fast computer-controlled rapid target acquisition of the Type 09 and an improved version of the radar and electro/optical setup of the LD-2000. The turret can rotate 360 degrees, with the BK-1060 capable of a full rotation in only five seconds. (Must be a hell of a ride, especially if the turret is slewing back and forth to engage targets and the FC system is on automatic...) The BK-1060, however, does not have tracking radar, though it does have good-range surveillance; though the Chinese indicate they may add tracking radar in the future, for now final sighting and targeting is done with the electro/optical suite and the FC computer. (The international conclusion among military experts is that the BK-1060 is too light to take the additional weight of a tracking radar and the associated electronics available to the Chinese at this time.) The system was designed primarily for use against low-flying helicopters and UAVs at ranges of 3-4 kilometers, though it is quite capable of being used against ground targets. For use against air targets, particularly relatively-fragile UAVs, a new PFPF round has been devised specifically for the BK-1060, it's ground mounted counterpart, and future vehicle already being designed to use this gun.

The turret is mounted on the hull of the ZBL09 family of wheeled armored vehicles. This is a relatively compact 8x8 chassis with tires that are run-flat, puncture resistant, and have central tire pressure regulation. Armor is relatively thin and made from hardened steel which uses a combination of welds and bolts. Applique and ERA kits are available for the BK-1060. The BK-1060 has six-compartment fire detection and suppression. The crew enjoys NBC Overpressure protection, as well as a ration heater, 40-liter drinking water tank, and a heater and air conditioner. The underside has additional armor for protection against mines and IEDs. The ZBL09 series has something new for Chinese system – a BMS, including a vehicle state computer, GPS/GLONASS, and a mapping module.

The engine is the standard German-made Deutz BF6M1015C, a turbocharged diesel designed for high acceleration and developing 440 horsepower. Like the rest of the ZBL09 series, the BK-1060 is amphibious with minimal preparation; in the water, it is propelled by waterjets. Rumors say that the BK-1060 may carry an APU of up 10kW, but I have not been able to confirm this and it is not included in the stats below. The BK-1060 retains the doors of the ZBL09 APC version, though they are used primarily for quick ammunition resupply and other resupplying.

A version of the BK-1060 has recently been shown at international gun shows. It has most of the components of the BK-1060, but uses the LD-2000's version of the 30mm rotary Gatling gun. It has been shown at arms shows, but it has yet to be offered for sale, and I haven't been able to discover whether the PLA is using them. However, I have included on below, under the provisional designation of BL-1070.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
BK-1060	\$710,169	D, A	800 kg	20 tons	3	17	Backup Camera (D), Radar (15 km) (G, C), 2 <sup>nd</sup> Gen FLIR (G), 2 <sup>nd</sup> Gen Image Intensification (G, C)	Shielded
With Applique Armor	\$747,996	D, A	670 kg	20.52 tons	3	19	Backup Camera (D), Radar (15 km) (G, C), 2 <sup>nd</sup> Gen FLIR (G), 2 <sup>nd</sup> Gen Image Intensification (G, C)	Shielded
BK-1070	\$720,024	D, A	790 kg	19.98 tons	3	20	Backup Camera (D), Radar (15 km) (G, C), 2 <sup>nd</sup> Gen FLIR (G), 2 <sup>nd</sup> Gen Image Intensification (G, C)	Shielded
With Applique Armor	\$757,851	D, A	690 kg	20.5 tons	3	22	Backup Camera (D), Radar (15 km) (G, C), 2 <sup>nd</sup> Gen FLIR (G), 2 <sup>nd</sup> Gen Image Intensification (G, C)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
BK-1060	170/86	48/24/6	656	163	Trtd	W(6)	TF12 TS6 TR5 HF15 HS8 HR6*

With Applique Armor	166/84	47/23/6	656	167	Trtd	W(6)	TF15Sp TS8Sp TR6 HF18Sp HS12Sp HR10**
BK-1070	170/86	48/24/6	656	163	Trtd	W(6)	TF12 TS6 TR5 HF15 HS8 HR6*
With Applique Armor	166/84	47/23/6	656	167	Trtd	W(6)	TF15Sp TS8Sp TR6 HF18Sp HS12Sp HR10**

Vehicle	Fire Control	Stabilization	Armament	Ammunition
BK-1060/w Applique	+3	Fair	35mm PG99-1 Autocannon	600x35mm
BK-1070/w Applique	+3	Fair	1xType 730 30mm 7-barrel Gatling Gun	900x35mm

\*Floor AV for the BK-1060 and BK1070 is 6Sp.

\*\*Floor Armor for the BK-1060 and BK-1070 with applique armor is 6Sp. Turret roof armor is AV5.

### EQ2050/FN-6A SAM Vehicle

Notes: This vehicle mounts a turret, very much like that of the US-made Avenger, on an EQ2050, an almost exact copy of the M-998 HMMWV. The vehicle has been put into limited PLA service, but it is also used by Belarus and Zimbabwe. The turret, as stated, is shaped somewhat like that on the HMMWV Avenger, but is larger and has sensors both at the bottom of the turret and on the right side of the turret under the missile racks. These sensors include a FLIR, an image intensifier, a 6x telescopic sight, a day/night magnified CCD camera, and a UV tracker, along with a laser rangefinder. (There is some question as to whether the laser is eye-safe, as, while the laser is at a frequency the human eye can't see, it is in the high-IR wavelength and could possibly cause pinprick retinal burns.) The turret is lightly armored, including a bullet-resistant window. There are four missiles on each side of the turret, and the left side also has a W-85 heavy machinegun for self-defense, along with a box of ammunition below it. The fire control system has computer assistance.

The base EQ-2050 chassis is also lightly armored (it actually has no floor armor at all). The EQ2050 chassis is based on the "Pickup truck" style of HMMWV, with a large rear flatbed and a small front cab. The vehicle is powered by a Cummins EQB150-20 turbocharged diesel engine developing 150 horsepower. This engine normally gives the EQ2050-based vehicles good power and agility, the weight of the SAM vehicle robs the SAM vehicle of much of this power. The EQ2050 base has all-wheel drive, a high ground clearance, and a central tire inflation system, giving it better-than-normal off-road performance. The vehicle normally uses a driver in the cab and a gunner in the turret; however, except in high-threat circumstances, the gunner normally also rides in the cab. Inside the cab and turret, the crew has air conditioning and heating, as well as NBC Overpressure protection. The vehicle carries a 5kW APU for use when the vehicle's engine is switched off. The vehicle has GPS navigation with a mapping module. The cab is slightly enlarged to allow the crew to carry personal effects such as gear, rations, water, etc.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$1,136,825	D, A	400 kg	6.8 tons	2	10	FLIR (G), 2 <sup>nd</sup> Gen Image Intensification (G), Day/Night CCD Camera (G)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
171/86	48/24	244	55	Trtd	W(2)	TF3 TS2 TR2 HF2 HS2 HR2*

Fire Control	Stabilization	Armament	Ammunition
+2	Basic	8xFN-6A SAM launchers, W-85	8xFL-6A SAMs, 1500x12.7mm

\*The hull armor figures are for the cab only. However, the entire hull floor has an AV of only 1.

### HN-5 SAM Vehicle

Notes: This Chinese system is a light antiaircraft vehicle mounting 8 launchers for HN-5, QW-1, or QW-2 surface to air missiles. The launchers are mounted on a light truck chassis known as the EQ2050, which is an early near-copy of the US HMMWV. The gunner can control the missiles by their IR guidance system, or control them manually for a high-countermeasure environment. The gunner is in the back seat of the truck, with his fire control equipment, and the commander and driver in front. The gunner has a modicum of electro-optical aids, while the commander has a reduced set to help find targets. The vehicle is a bit dated, however, and does not have the fire control suite of a newer vehicle. The vehicle has no sort of radar, as its missiles are IR missiles, but is equipped with a laser rangefinder. The missiles and launcher are in the back of the vehicle; other details are roughly the same as an early M998-series HMMWV.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$212,877	D, A	400 kg	4.2 tons	3	10	Passive IR (G, C), Image Intensification (G, C), Thermal Imaging	Open

(G)

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
257/180	72/50	244	63	Trtd	W(2)	TF1 TS1 TR1 HF1 HS1 HR1
Fire Control	Stabilization	Armament			Ammunition	
+2	None	8xHN-5/QW-1/QW-2 launchers			8xHN-5/QW-1/QW-2 SAMs	

**LD-2000**

The LD-2000 is a long, armored truck which has a control module and driver's position in the cab and a remotely-controlled 30mm seven-barrel Type 730 CIWS, which is normally mounted on ships as a cruise missile and antishipping missile defense. The LD-2000 is meant for short-range destruction of UAVs, cruise missiles, aircraft, and to a smaller extent, ATGM, other missiles, and even artillery shells. The LD-2000 is normally stationed along with high-value targets to provide quick air defense, and acts as a part of a multilayered air defense solution.

In addition to the 30mm CIWS, the boxy center section of the LD-2000 contains six TY-90 vertically-launched SAMs. The CIWS fires from twin belts, one belt usually carrying HEAT-PF and the other having APDS rounds, with each belt carrying 1000 rounds. A further 3000 rounds are carried in the rear of the truck near the gun turret. The truck also has a surveillance/tracking radar atop the gun turret, which can be used with the missiles or the CIWS. The radar can track 48 potentially hostile targets and provide targeting information on 15 of them. Empty cartridge cases are ejected through the front of the turret (back of the truck) The turret is not fully traversing, though it does have a 300-degree traverse limit.

The fire-control system of the LD-2000's gun is primitive compared to that of the shipboard Type 730. The gun does not automatically acquire engage targets; instead, this must be done by the gunner in the cab, after consulting the radar and electro-optical systems. A simple push button is all that's needed to actuate the gun, whose functions then become automatic until the button is pushed again. He also has control over the TY-60 missiles, though the commander also has control over the gun and missiles. In addition, there is a seat in the turret for use by the gunner when quicker response is needed. The FC package also include a laser rangefinder (mostly for target verification). The surveillance radar is a Type 347G surveillance radar with a range of 12 kilometers. Above the gun is a dish-type digital array also capable of 12 kilometers of range. Before firing, four hydraulic rams are lowered on the corners of the vehicle. Though the LD-2000 gun truck includes radar and remotely-operated night vision equipment, the LD-2000 is normally accompanied with a tracked Intelligence & Command Vehicle, a mechanized infantry platoon, and four Ammo Supply vehicles (ASV), with 12000 rounds and loading machinery on each truck. The gun and turret are remote-control and controlled by the gunner in the center of the cab. Fire control equipment is contained as the rear of the cab, with a space for personal gear, rations, water, and a single cot behind the front seats. The weapon system has a vehicle state computer, but nothing like a BMS; it relies on an ICR vehicle for such purposes.

The hull, being a variant of the WS2400, with independently-sprung shock absorber systems and a central tire inflation system, along with run flat puncture resistant tires. The entire truck has a low-level of armor. The truck can run for short distances with the central tire shot away for 80 kilometers at 50 kmh. The engine is German-made Deutz engine with automatic transmission, a turbocharged diesel with 571 horsepower.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological*
\$2,618,320	D, A	500 kg	19 tons	3	19	Backup Camera (D), Radar (12/12 km) (G, C), FLIR (G), 2 <sup>nd</sup> Gen Image Intensification (G, C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor**
213/108	59/30	852	203	Trtd	W(5)	TF8 TS6 TR6 HS4 HS3 HR2
Fire Control	Stabilization	Armament			Ammunition	
+2	Fair	1xType 730 30mm 7-barrel Gatling Gun, 6xTY-60 SAMs			2x1500x30mm, 6xTY-60	

\*Only the Cab and Turret are so shielded, along with the computer center; the rest of the truck is Enclosed.

\*\*\*The turret is, of course protected as stated. The Hull AV is against the cab only; the rest of the truck is AV3, including the roof and truck bottom.

**Strijela 10 CROA1**

Notes: This was at first thought to be based on a stretched chassis of a LOV armored personnel carrier, but it is now understood to be a separate chassis. Like the LOV, it is based on an armored version of a cargo truck, in this case the TAM 150 T11 BV, with a raised suspension for better off-road performance. On top of this chassis is the entire turret of the SA-13 (MT-LB) SAM vehicle; as Croatia's MT-LB-based vehicles were getting rather old and worn, it was felt that it would be better to scrap these vehicles and simply use the turrets on a vehicle that was newer and had better on-road performance. To these vehicles were added better targeting systems, night vision, and computers. At the rear of the vehicle is a short-range radar set with a range of 20 km.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$175,912	D, A	1 ton	13.2 tons	4	7	Radar, Passive IR, Image Intensification	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
122/48	31/12	150	49	Trtd	W(4)	TF4 TS4 TR3 HF5 HS3 HR3

Fire Control	Stabilization	Armament	Ammunition
+3	Basic	4xSA-13 launchers, M-2HB (C)	8xSA-13 SAMs, 600x.50

**M-53/59**

Notes: This older Czech self-propelled antiaircraft gun is mounted on an armored and much-modified Praga V3S truck (see Czech Medium Unarmored Vehicles). The guns are fed from vertical magazines holding 50 rounds for each gun. The entire gun platform can be removed and deployed away from the carrier vehicle, but this was not normally done unless the vehicle was damaged beyond moving. The M-53-59 is a clear weather system, as no radar or night vision equipment is provided. This vehicle is used by Czech reserve forces, Yugoslavia, and Libya.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$49,981	D, A	1 ton	10.3 tons	5	3	Headlights	Enclosed (Open for Gun Crew)

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
124/50	31/13	120	32	Trtd	W(3)	TF1 TS1 TR1 HF3 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
+1	Basic	Twin 30mm M-53 Autocannons	800x30mm



**BTR-152/M-53**

Notes: This is an Egyptian modification of the BTR-152, mounting a quad M-53 (the Czech version of the DShK) machinegun installation. A small number of these systems have turned up in Afghanistan, used as convoy escort vehicles, and normally used in the antipersonnel role.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$65,805	G, A	400 kg	7.65 tons	2+3	3	Headlights	Open

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
120/48	30/12	300	79	Std	W(3)	HF2 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	4xDShK	4600x12.7mm

**Jantronics J-1000**

Notes: Built on the same chassis as the XA-181 Crotale vehicle, the J-1000 is an Ericsson Giraffe radar of French make mounted on an XA-180-series chassis. The radar dish is mounted on a mast that can be raised 15 meters above the roof of the vehicle. The radar has a range of 50 km. This vehicle is used to increase the detection and tracking range of vehicles such as the XA-181 or certain antiaircraft guns, or provide radar to missile and gun systems that require a separate radar unit or do not otherwise have radar. Before raising the radar mast, four outriggers are deployed, one at each corner of the vehicle.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$117,709	D, A	400 kg	14.85 tons	4	7	Radar, Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
126/50	32/13/3	290	79	CIH	W(4)	TF1 TS1 TR1 HF8 HS3 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	PKT (C)	2000x7.62mm

**MOWAG Piranha III/TriAD**

Notes: This Finnish antiaircraft vehicle, chosen by the Finnish government over the protests of the Finnish Army, is a 10x10 Piranha III topped with the same turret as the Swedish TriAD self-propelled antiaircraft gun. The Finnish government's analysis told them that this chassis was able to carry more ammunition than a comparably equipped XA-180-series vehicle, and would be better despite the increased weight, decreased mobility, and increased fuel consumption.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$149,773	D, A	1.5 tons	24 tons	4	9	Radar, Passive IR, Thermal Imaging	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
136/54	34/14/4	400	116	Trtd	W(8)	TF14 TS8 TR6 HF6Sp HS4Sp HR4

Fire Control	Stabilization	Armament	Ammunition
+3	Good	40mm Bofors L/70, PKT	475x40mm, 4500x7.62mm

**XA-181**

Notes: This Finnish antiaircraft vehicle is an XA-180 with a turret mounting a Crotale NG (New Generation) missile system. As a New Generation vehicle, it does not require a separate radar unit to make intercepts, though it often uses one to increase the detection range, as the range on the on-board radar is about 20 km. The launcher consists of two 4-round launcher tubes. In this version, passengers are not carried, the rear area being taken up by turret mechanisms, computers and fire control equipment, and a small crew.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$303,006	D, A	500 kg	15.1 tons	4	7	Radar, Passive IR, Thermal Imaging, Image Intensification	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
128/52	32/13/3	290	82	Trtd	W(4)	TF6 TS4 TR3 HF8 HS3 HR2

Fire Control	Stabilization	Armament	Ammunition
+3	None	8xCrotale Launchers	8xCrotale SAMs

**AML-S530**

Notes: This is a Panhard AML with a turret mounting twin 20mm autocannons. The new turret has hatches in the roof for the commander and gunner.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$64,092	D, A	300 kg	5.5 tons	3	2	Passive IR, WL Searchlight	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
156/62	39/16	156	34	Trtd	W(3)	TF3 TS3 TR3 HF3 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
+1	Good	Twin 20mm Giat M 621 Autocannons	600x20mm

**Crotale**

Notes: Crotale is a light SAM launcher used by France, Abu Dhabi, Chile, Egypt, Libya, Pakistan, Saudi Arabia, and South Africa (where it is known as the Cactus). The system has two parts: the launcher vehicle and the radar vehicle. (Crotale New Generation does not require the radar unit.) The unit is mounted on a lightly armored 4x4 chassis. The launcher and radar units may be up to 3000 meters apart, linked by radio.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Radar Unit	\$89,315	D, A	400 kg	12.62 tons	2	7	Radar, Passive IR	Enclosed
Firing Unit	\$165,481	D, A	400 kg	14.95 tons	2	7	Radar, Passive IR	Enclosed
Crotale NG	\$185,481	D, A	400 kg	14.95 tons	2	8	Radar, Thermal Imaging	Enclosed

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
Radar Unit	184/74	46/19	200	103	CIH	W(3)	TF1 TS1 TR1 HF4 HS3 HR3
Firing Unit/NG	170/68	43/17	200	107	Trtd	W(3)	TF2 TS2 TR2 HF4 HS3 HR3

Vehicle	Fire Control	Stabilization	Armament	Ammunition
Radar Unit	None	None	MAG (C)	750x7.62mm
Firing Unit/NG	+3	None	4xCrotale Launchers	4xCrotale SAMs

**Panhard ERC-20 Kriss**

Notes: This is a version of the ERC-90 fitted with a SAMM TAB 220 antiaircraft turret mounted in place of the normal turret. This is a clear-weather system that is not equipped with radar. This version had sales only to Gabon. The Kriss has twin smoke grenade launchers on either side of the turret.

Twilight 2000 Notes: ERC-20s were diverted from shipments to Gabon and placed in Service with the Foreign Legion.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
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\$99,340	D, A	300 kg	8.3 tons	3	3	Passive IR, Image Intensification	Enclosed
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Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
108/44	27/11/3	242	33	Trtd	W(3)	TF3 TS3 TR3 HF8 HS6 HR4

Fire Control	Stabilization	Armament	Ammunition
+3	Fair	Twin 20mm Giat M621 Autocannons	1080x20mm

### Panhard ERC Santal

Notes: This is a version of the ERC-90 fitted with a two-man SANTAL turret with two 3-round Matra Mistral launchers and four smoke grenade launchers. This version is equipped with radar. The Santal is used only by France.

Twilight 2000 Notes: As they were still at the prototype stage at the November nuclear exchange, they are rare.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$315,200	D, A	300 kg	8.3 tons	3	6	Radar, Passive IR, Thermal Imaging	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
96/38	24/10/3	242	26	Trtd	W(3)	TF3 TS3 TR3 HF8 HS6 HR4

Fire Control	Stabilization	Armament	Ammunition
+3	Fair	6xMistral SAM launchers	18xMistral SAMs

### Panhard M-3/VDA

Notes: This is an antiaircraft version of the Panhard M-3 shown in French Armored Personnel Carriers on this web site. In this role, the M-2 has a turret mounting twin 20mm autocannons in a light turret. The system is equipped with radar for all-weather use. Sales include the Ivory Coast, Niger, and United Arab Emirates.

Twilight 2000 Notes: This vehicle was not used by France before the Twilight War, but some shipments to other countries were diverted to Foreign Legion use when the Legion deployed to the Middle East.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$115,766	G, A	400 kg	7.2 tons	3	5	Radar	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
86/34	22/9/2	165	30	Trtd	W(2)	TF2 TS2 TR2 HF3 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
+3	Fair	Twin Giat M621 Autocannons, AAT-F1	600x20mm, 200x7.62mm

### VAB HML

Notes: This is a 4x4 VAB armored personnel carrier topped with the SANTAL turret, as mounted on some versions of the Panhard ERC. The turret has a small hatch in between the missile launchers with a light machinegun mount, and is equipped with target acquisition radar. Inside the vehicle are the guidance system, a radar interface, and the launching electronics. The missiles are aimed by a periscopic sight.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$287,384	D, A	400 kg	11.5 tons	3	6	Radar, Passive IR	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
142/58	36/15/4	300	74	Trtd	W(3)	TF3 TS3 TR3 HF6 HS4 HR3

Fire Control	Stabilization	Armament	Ammunition
+3	Fair	6xMistral SAM Launchers, AAT-F1 (C)	18xMistral SAMs, 1000x7.62mm

### VAB VDAA

Notes: This is a 6x6 VAB APC fitted with the same turret as the Panhard M-3/VDA. The vehicle carries a large amount of ammunition and the gun crew and the gun turret, and some extra communications gear. Passenger space is deleted. The vehicle is equipped with radar for all-weather use. This vehicle, though built in France, is used only by Oman.

Twilight 2000 Notes: Some were diverted from those shipments for French Foreign Legion use during the War, and sent to the Middle East.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$114,417	D, A	500 kg	14.2 tons	3	8	Radar, Passive IR	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
126/50	32/13/3	300	76	Trtd	W(3)	TF2 TS2 TR2 HF6 HS4 HR3

Fire Control	Stabilization	Armament	Ammunition
+3	Fair	Twin Giat M621 Autocannons, AAT-F1	3500x20mm, 4000x7.62mm

### VBL LWB Air Defense Vehicle

Notes: This is a Long Wheelbase VBL carrying a mount for twin Mistral launchers.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$29,400 (R/R)	G, AvG, A	300 kg	4 tons	3	6	Passive IR	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Type	Config	Susp	Armor
185/80	45/19/6	130	40	SP Antiaircraft Missile	Trtd	W(2)	TF1 TS1 TR1 HF2 HS2 HR2

			Launcher		
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Fire Control	Stabilization	Armament	Ammunition
+2	None	Twin Mistral Launcher, MAG (C)	6xMistral, 1000x7.62N

**ADAMS**

Notes: ADAMS (Air Defense Advanced Mobile System) is a version of the HVSD (High-Value Site Defense) system mounted on a Mercedes-Benz heavy truck chassis and lightly armored. The cargo bed is fitted with a Phalanx CIWS antiaircraft gun system behind the cab; this is basically a 20mm Vulcan autocannon with an integrated radar system and a highly moveable base with very high rates of elevation and traverse, to be able to keep pace with fast aircraft and incoming missiles. To the rear of this gun is a control module with fire control electronics and crew positions. On the back of the truck is a module containing 12 Israeli-made Barak-1 antiaircraft/antimissile missiles. Both weapons of the system are useful against both aircraft and weapons like precision-guided munitions and tactical missiles. This vehicle is said to be in the advanced testing phase in Israel, and will probably eventually be deployed there; however, the US military appears to have passed on it due to budgetary reasons.

Twilight 2000 Notes: This weapon system was highly effective, but very rare, in the Twilight War, with perhaps 12 systems being made for Israel and 20 for the US (split in about half for the Middle Eastern and European theatres).

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$452,768	D, A	700 kg	16 tons	6	8	Radar, Thermal Imaging, Image Intensification	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
152/62	38/16	300	96	Std	W(3)	HF2 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
+4	None	20mm Vulcan, 12xBarak-1 SAM launchers	1550x20mm, 12xBarak-1 SAMs

**MOWAG Eagle Air Defense Vehicle**

Notes: This vehicle was designed to provide highly mobile air defense, and was used primarily by the Swiss and Danish Air Forces for defense of airfields. The vehicle consists of a standard Eagle chassis modified with a rotating mount for Mistral missiles, and a downlinked fire control suite inside the vehicle for aiming and firing the missiles. Additional missiles are carried inside the vehicle.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$196,707	D, A	600 kg	4.8 tons	3	4	Thermal Imaging, Passive IR	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
222/88	56/22	95	57	Trtd	W(3)	TF2 TS2 TR2 HF5 HS5 HR4

Fire Control	Stabilization	Armament	Ammunition
+2	Basic	4xMistral launchers	8xMistral SAMs



**BTR-152/TCM-20**

Notes: In the course of her wars with her neighbors, Israel captured many vehicles, including dozens of BTR-152s. A few of these were used as APCs by Israeli police, but most were converted as weapons carriers, including a carrier for the TCM-20 antiaircraft gun. These vehicles have no integral radar, but may be linked to radar provided by outside sources.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$59,375	G, A	400 kg	7.66 tons	2+3	3	Headlights	Open

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
120/48	30/12	300	79	Trtd	W(3)	TF2 TS1 TR0 HF2 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
+1	None	TCM-20 Twin 20mm Autocannons	3000x20mm

**RAM TCM-20**

Notes: This is a version of the RAM V-2 fitted with a turntable-mounted twin 20mm light antiaircraft gun. The guns are partially stabilized. No radar is fitted, so it is a clear-weather system.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$39,198	D, A	300 kg	5.75 tons	4	2	Headlights	Open

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
172/68	43/17	160	49	CiH	W(2)	TF2 TS1 TR1 HF2 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
+1	Fair	TCM-20 Twin 20mm Autocannons, MAG (C)	720x20mm, 1000x7.62mm

**Chaimite V-300 Antiaircraft Variant**

This is the same as the the V-300 Recon Variant, except for the turret armament.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$63,007	D, A	800 kg	8.81 tons	3	3	Passive IR, Image Intensification	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
212/127	45/30/5	300	79	Trtd	W(3)	TF2 TS2 TR2 HF3 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
+2	Fair	Twin Giat Type 20 M 621 autocannons, MG-3, MG-3 (C)	450x20mm, 4750x7.62mm

**TABC-79/SA-9**

Notes: Just as Romania's MT-LB-based SA-13 carriers were getting old, so were their BRDM-2-based SA-9 vehicles. As with the SA-13s, the SA-9 turrets were placed on TABC-79 chassis. Again, the TABC-79 in this role does not carry passengers, the space now taken up by the turret and reload missiles and firing electronics.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$161,480	D, A	400 kg	9.25 tons	3	5	Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
123/62	34/18/4	200	49	Trtd	W(3)	TF2 TS2 TR2 HF3 HS3 HR2

Fire Control	Stabilization	Armament	Ammunition
+2	None	4xSA-9 SAM launchers	8xSA-9 SAMs

**TABC-79/SA-13**

Notes: As Romania's MT-LBs were getting a little long in the tooth and harder to maintain, Romania removed the SA-13 launchers from the MT-LB base vehicles and mounted them on modified TABC-79 scout vehicle chassis. The vehicle, in this role, does not carry passengers, the space now taken up by the turret machinery and reloads for the missile launcher. It is otherwise a standard TABC-79, except for the armament and turret.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$181,095	D, A	400 kg	9.55 tons	4	6	Radar, Active IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
119/60	33/17/4	200	49	Trtd	W(3)	TF2 TS2 TR2 HF3 HS3 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	4xSA-13 SAM Launchers	8xSA-13 SAMs

**BTR-40A**

Notes: This is a BTR-40 armed with a ZPU-2 mount in a manually operated turret. This vehicle was developed at the same time as the APC version of the BTR-40, and was often used in a ground-support role as well as an anti-aircraft gun. Note that the BTR-40A is not equipped with the BTR-40's firing ports. The vehicle is otherwise a BTR-40, with an 80-horsepower gasoline engine developed from a GAZ-63 commercial truck engine.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$46,134	G, A	314 kg	5.5 tons	2+3	4	Headlights	Open

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor		
101/51	28/14	120	33	CiH	W(2)	TF1	TS1	TR1 HF3 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	ZPU-2	2400x14.5mm

**BTR-152 AA Vehicles**

Notes: The BTR-152A is a BTR-152 (open-topped version) with a ZPU-2 manually operated turret. This vehicle was developed at the same time as the APC version of the BTR-152, and was often used in a ground-support role as well as an anti-aircraft gun. The BTR-152D is a BTR-152A with a ZPU-4 mount instead of a ZPU-2 (four KPVs instead of two).

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
BTR-152A	\$46,096	G, A	365 kg	7.38 tons	2+3	6	Headlights	Open
BTR-152D	\$79,077	G, A	365 kg	7.64 tons	2+3	6	Headlights	Open
BTR-152/ZU-23	\$144,412	G, A	365 kg	7.63 tons	2+3	6	Headlights	Open

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor		
(All)	125/63	34/18	300	61	Trtd	W(3)	TF1	TS1	TR1 HF2 HS2 HR2

Vehicle	Fire Control	Stabilization	Armament	Ammunition
BTR-152A	None	None	ZPU-2	2000x14.5mm
BTR-152D	None	None	ZPU-4	4000x14.5mm
BTR-152/ZU-23	None	None	ZU-23-2	2500x23mm

**Pantzyr ADA**

Notes: The Pantzyr (also Pantsir, meaning "Carpace") is a truck mounted anti-aircraft/missile launcher on a KamAZ 8x8 truck frame. It is normally deployed in conjunction with the various ZSU self-propelled anti-aircraft guns or the S-300 or S-400 SAM systems. The system is derived from that of the ZSU-30-2. Designed with a surface radar system to track incoming aircraft, the Pantzyr-S1 initially proved to be very effective against aircraft. It is capable of engaging up to three aerial targets at the same time, a feature that makes it very difficult to engage. Combat use includes by Russia and Ukraine (the latter using a captured Pantzyr) in the current conflict, by the Libyan National Army in the 2019 civil war (provided by the UAE), and in Syria (where they proved distressingly unable to down many Allied aircraft or Allied cruise missiles).

The Pantzyr-S1M is a modified version developed based on experience gained in Syria. It entered service in 2019, and removed any ZSU-30-2-based components other than the guns. It uses the upgraded SA-19C missile with a larger engagement envelope and a longer-ranged radar set. The Pantzyr-S2 is a further upgraded version of the Pantzyr-S1M with further upgraded radar, including a twin dish facing in opposite directions. The Pantzyr-SM increases the radar range further, with a detection range of 75 kilometers and an engagement range of 40 kilometers. The cab is armored from all directions of incoming fire.

Pantzyr systems are equipped with a BMS, GLONASS, and a land navigation system. Pantzyr-S1 and S1M vehicles are based on the chassis of a KamAZ-6560 truck with a turbocharged 400-horsepower diesel engine and an automatic transmission; Pantzyr-S2 and SM systems are based on the Belorussian-built MZKT-7930 TEL truck equipped with a turbocharged 680-horsepower diesel engine with an automatic transmission, and they also have an NBC Overpressure system.

Twilight 2000 Notes: The Pantzyr-S1 was spotted by reconnaissance elements of the 1st Brigade, 40th Infantry Division in June 1997. The vehicle was nicknamed the "Firecracker" by NATO pilots. Only 100 are known to have been produced and deployed before the November nuclear exchanges. The Pantzyr-S1M, Pantzyr-S2, and Pantzyr-SM are not available in the Twilight 2000 timeline.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Pantzyr-S1	\$1,105,962	D, G, AvG, A	449 kg	20 tons	3	17	Radar (18 km), Passive IR	Enclosed
Pantzyr-S1M	\$1,153,962	D, G, AvG, A	445 kg	20.8 tons	3	17	Radar (30 km), Passive IR	Enclosed

Pantzyr-S2	\$1,518,750	D, G, AvG, A	559 kg	26.88 tons	3	21	Radar (40 km), Passive IR, FLIR	Enclosed
Pantzyr-SM	\$1,521,222	D, G, AvG, A	559 kg	27.68 tons	3	23	Radar (75 km), Passive IR, FLIR	Enclosed

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
Pantzyr-S1	157/79	43/22	375	147	Trtd	W(4)	TF1 TS1 TR1 HF2 HS1 HR1
Pantzyr-S1M	152/77	42/22	375	147	Trtd	W(4)	TF1 TS1 TR1 HF2 HS1 HR1
Pantzyr-S2	190/96	52/26	600	250	Trtd	W(4)	TF1 TS1 TR1 HF2 HS2 HR2
Pantzyr-SM	184/93	50/25	600	250	Trtd	W(4)	TF2 TS2 TR2 HF3 HS2 HR2

Vehicle	Fire Control	Stabilization	Armament	Ammunition
Pantzyr-S1/S1M	+2	Fair	12xSA-19 SAM launchers, 2x30mm 2A38M Autocannons	12xSA-19 SAMs, 802x30mm
Pantzyr-S2/SM	+2	Fair	12xSA-19 SAM launchers, 2x30mm 2A38M Autocannons	12xSA-19 SAMs, 1604x30mm

### 9K33 Osa (SA-8 Gecko)

Notes: The Osa (Wasp) system is based on a chassis known as Transporter (BAZ) 5937, which is fully amphibious and very mobile cross-country for a wheeled vehicle. The Osa was designed in response to the then-upcoming US Mauler missile system, which was later cancelled.

The Osa carries surveillance and tracking radar for target acquisition, with the radar having a 40-kilometer detection range and a 20-kilometer tracking and engagement range. The tracking radar unit consists of a large primary radar and two smaller dishes on either side of the main radar which provide additional tracking capability. The pair of tracking radar dishes allow the Osa to guide two missiles at a time, against different targets. However, these radar dishes are fixed and have only a 30-degree cone of detection and tracking, though the entire radar and missile unit is on a turntable. From initial detection to engagement, the Osa needs only 26 seconds, though to start from a moving Osa to tracking and then engagement takes four minutes. The radar system is equipped with ECCM. The Osa also has a tubular electro-optical tracker above the radar array; this is used to hand-fly the missiles when they are otherwise rendered useless by ECM. The Osa may also be linked to an external radar network to take advantage of a system with possibly superior range and ECCM and greater ADA coordination.

The 9K33 basic version uses a four-missile launcher and has the radar mentioned above. They use 9M33 (SA-8A) missiles. The 9K33M2 uses the same radar array with 9M33 or 9M33M2 (SA-8B) missiles in a 6-round launcher contained each in a sealed launcher box. The 9K33M3's main radar has an increased detection range and is equipped with an IFF antenna, something previous iterations lacked. It is designed for the increased-envelope 9M33M3 (SA-8C) missile. The 9K33M3 may also use special wire-guided versions of the 9M33M3 missile for use in heavy ECM conditions, though these wire-guided SAMs proved to be inadequate for following fast aircraft or maneuvering aircraft. The 9K33 and 9K33M2 have ECCM 1, while the 9K33M3 has ECCM 2.

The Osa is equipped with inertial navigation and a mapping system and has an NBC Overpressure system. The chassis is amphibious without preparation, though the turret must be swung forward and locked into traveling position. The vehicle uses 300-horsepower D20K300 turbocharged diesel engine, with a manual transmission. The Osa has a central tire inflation system. There are hatches above the driver's and commander's positions; all crewmembers enter and exit through these hatches.

Reloads are carried on another Transporter 5937, modified for cargo carrying; this vehicle carries 12 SA-8 SAM missiles and a crane for reloading the launcher vehicle. This system is used by Russia, Algeria, Angola, the Czech Republic, Slovakia, India, Iraq, Libya, Poland, Syria, and Yugoslavia.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
9K33	\$1,312,468	D, A	489 kg	18.8 tons	5	19	Passive IR (D, G), Radar (40 km) (G, C), Image Intensification (G, C)	Enclosed
9K33M2	\$1,106,618	D, A	612 kg	18.27 tons	5	19	Passive IR (D, G), Radar (40 km) (G, C), Image Intensification (G, C)	Enclosed
9K33M3	\$1,218,458	D, A	607 kg	18.41 tons	5	19	Passive IR (D, G), Radar (48 km) (G, C), Image Intensification (G, C)	Enclosed

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
9K33	132/66	37/18/4	350	110	Trtd	W(3)	TF1 TS1 TR1 HF1 HS1 HR1
9K33M2	136/68	38/19/4	350	110	Trtd	W(3)	TF1 TS1 TR1 HF1 HS1 HR1
9K33M3	135/67	38/19/4	350	110	Trtd	W(3)	TF1 TS1 TR1 HF1 HS1 HR1

Vehicle	Fire Control	Stabilization	Armament	Ammunition
9K33	+2	None	4xSA-8 Launchers	4xSA-8 SAMs
9K33M2	+3	None	6xSA-8 Launchers	6xSA-8 SAMs
9K33M3	+3	None	6xSA-8 Launchers	6xSA-8 SAMs

### 9K31 Strela-1 (SA-9 Gaskin)

Notes: This SAM system mounts its missiles on a modified BRDM-2 scout car. The SA-9 is used by many countries, including Russia, Algeria, Angola, Benin, Cuba, Croatia, Egypt, Ethiopia, India, Iraq, Libya, Mauritania, Mozambique, Nicaragua, Syria, Vietnam, Yemen, Yugoslavia, and the former members of the Warsaw Pact. Its low cost allowed it to be bought by many smaller countries.

The BRDM-2 chassis is modified, replacing the standard turret with one mounting four 9M31 (SA-9) missiles, as well as IR detection and targeting gear and a telescopic sight. The Strela-1 is also equipped with an NBC Overpressure system.

Most examples of the Strela-1 are equipped with only IR detection and targeting equipment, though one vehicle per battery has radar to enhance target detection capabilities. Nonetheless, the SA-9 missiles are IR-guided. This radar-equipped Strela-1 has a detection range of 30 kilometers. Strela-1s also have radio and radar detectors with a range of 20 kilometers. The 9K31M vehicle differs primarily in being able to fire the improved 9M31M missile.

Like its base chassis, the Strela-1 is powered by a 140-horsepower gasoline engine coupled to a manual transmission. It is amphibious without preparation, though the turret must be swung forward and locked into traveling position. The vehicle has a central tire pressure regulation system.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
9K31	\$240,634	G, AvG, A	354 kg	7 tons	3	7	Passive IR (D, G)	Shielded
9K31A	\$720,634	G, AvG, A	354 kg	7.1 tons	3	9	Radar (30 km) (G), Passive IR (D, G)	Shielded
9K31M	\$250,349	G, AvG, A	354 kg	7 tons	3	7	Passive IR (D, G)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
9K31	157/79	43/22/5	290	77	Trtd	W(3)	TF2 TS2 TR2 HF6 HS3 HR2
9K31A	155/78	42/22/5	290	77	Trtd	W(3)	TF2 TS2 TR2 HF6 HS3 HR2
9K31M	157/79	43/22/5	290	77	Trtd	W(3)	TF2 TS2 TR2 HF6 HS3 HR2

Vehicle	Fire Control	Stabilization	Armament	Ammunition
(All)	+2	None	Quadruple SA-9 Launcher	4xSA-9 Missiles

**Ystervark**

Notes: The Ystervark (named for a South African species of porcupine) is a South African self-propelled anti-aircraft gun, based on an armored and mine-protected version of the SAMIL 20 truck. This vehicle has a much higher and beefier suspension than the basic truck, leading to better cross-country performance, and the vehicle is used to protect truck convoys as well as for anti-aircraft use. The Ystervark has an armor rating of twice the highest face against mines, and the suspension rating is one higher against mines. The sides of the fighting compartment are droppable if necessary, but the fighting compartment has no overhead protection, and if the sides are dropped, no protection from those directions. The Ystervark has a 124-horsepower turbocharged diesel engine, and that along with the vehicle's light weight lead to a surprisingly mobile platform.

The Ystervark is based on the Buffel APC and has an MRAP hull. Other nice touches include a 100-liter drinking water tank, accessible through a tap located at the vehicle's rear left. The cab has a roof, but it is made of high-density polyethylene and has an AV of only 1.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$48,083	D, A	525 kg	6 tons	5	4	Headlights	Open, Enclosed (Cab)

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
161/81	44/22	200	45	Trtd	W(3)	TF1 TS1 TR1 HF3 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
+1	None	20mm GAI-C01 20mm Autocannon	675x20mm

**ZA-HVM**

Notes: This South African surface-to-air missile system is based on a modified Rooikat chassis. On top of this chassis is a turret containing multiple sensors, fire-control equipment, and 4 launchers for SAHV-3 SAMs (a South African improvement of the French Crotaie missile). The radar on this vehicle has a range of 25 km. The vehicle was generally used to combat faster and higher-flying enemy aircraft. This vehicle was not developed beyond the advanced prototype phase. The ZA-HVM is powered by a 535-horsepower turbocharged engine, with a manual transmission.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$775,617	D, G, A	740 kg	25.75 tons	4	19	Thermal Imaging, Image Intensification, Radar (20 km)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
168/85	47/23	540	205	Trtd	W(8)	TF8 TS4 TR4 HF20 HS7 HR6

Fire Control	Stabilization	Armament	Ammunition
+3	Fair	4xSAHV-3 launchers	8xSAHV-3 SAMs

**Bosvark**

Notes: The Bosvark (named for a South African bush pig) South African SPAAG is based on an armored and mine-protected version of the SAMIL 100 truck called the Kwevoel. It has an armored cab and flatbed floor for the crew, and mounts a ZU-23-2 anti-aircraft gun on the flat rear section. The vehicle is considered to have an armor value of twice the highest face against mines, and the suspension rating is one higher against mines. The cab has two entry doors on each side, with two sitting in the front and three in the rear. Half of the flatbed section is taken up by the gun, and most of the rest is taken up by large lockers for ammunition, camouflage nets, and crew equipment. Note that when operating the gun, the crew has no side, front, overhead, or rear armor protection. The Bosvark has a 315-horsepower diesel engine, with a manual transmission.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$74,637	D, A	565 kg	19.5 tons	5	12	Headlights	Open, Enclosed (Cab)

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
133/67	37/18	500	116	Trtd	W(3)	TF1 TS1 TR1 HF4 HS4 HR3

Fire Control	Stabilization	Armament	Ammunition
+1	None	ZU-23-2 Autocannon, SS-77 (C)	600x23mm, 1000x7.62mm

**BMR-3560/SIDAM**

Notes: This Spanish antiaircraft vehicle is a BMR-600 armored personnel carrier with the machinegun cupola deleted and the turret of the SIDAM-25 (see Italian Tracked Self-Propelled Antiaircraft) mounted on the rear deck. The passenger area is taken up with the turret mechanism and ammunition, the rear deck hatches are removed in favor of the turret, and there is a simple hatch in place of the commander's cupola.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$91,710	D, A	400 kg	14.05 tons	3	4	Passive IR	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
164/66	41/17/4	400	114	Trtd	W(4)	TF5 TS5 TR5 HF8 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
+1	Fair	4x25mm KBA autocannons	1400x25mm



**Tridon 4**

Notes: In 1995, the Swedish found themselves with a large number of Bofors L/70 anti-aircraft guns that they wished to be more mobile. Rather than design a new anti-aircraft gun from scratch, they designed a system based on a large all-terrain truck chassis common in civilian use and an advanced fire control system. The truck consists of a cab with the engine and accommodations for the driver and target designator while traveling, while the rear section has the gun and a control center with fire control computers and a radar unit. The system can also be datalinked to a more powerful radar unit located separately. The vehicle also has night vision for the gunner and a laser designator. Tridon is also equipped with an IFF receiver and the radar is capable of tracking 6 targets simultaneously. The Tridon has a 10kW APU so it can function with the engine shut off.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$131,781	D, A	800 kg	23 tons	5	9	Radar, Thermal Imaging	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
126/50	32/13	450	84	Trtd	W(3)	TF2 TS2 TR2 HF3 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
+3	Fair	40mm L/70 Autocannon	400x40mm

**Cobra Antiaircraft Vehicle**

Notes: This is a Cobra armored personnel carrier with the turret removed and a mount for a 4-round Stinger launcher mounted on the roof ahead of the rear deck hatches. The missiles are aimed and fired from inside the hull. The Cobra AAA is powered by a 190-horsepower turbocharged diesel engine with an automatic transmission, 4x4 suspension, power steering and brakes, air conditioning, and a central tire inflation system.

Twilight 2000 Notes: This is a small, fast vehicle that gave Greek, Iraqi, and Russian pilots no end to trouble during the Twilight War due to its ability to fire and then quickly disappear into the terrain.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$280,068	D, A	437 kg	6.3 tons	5	7	Thermal Imaging (G), Image Intensification (G)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
221/111	61/31/6	145	58	Trtd	W(3)	TF1 TS1 TR1 HF4 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
+3	None	4xStinger launchers	12xStinger SAMs

**Zipkin**

Notes: This is a Turkish air defense vehicle intended for use by light divisions and special operations units. It is a Land Rover chassis fitted with a light version of the Turkish variation of the PMSS. In this version, the mount has only 4 launchers instead of 8, to fit the lighter Land Rover chassis. The missile units are simply clipped onto the mounts on the sides of the launcher unit. However, sights and optics are better than on the PMSS. The base chassis is the Land Rover Defender 130, which has a 134-horsepower diesel engine and an automatic transmission.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$299,884	D, A	402 kg	3.96 tons	3	7	FLIR (G), Image Intensification (G)	Open

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
244/123	68/34	90	49	Trtd	W(2)	TF1 TS1 TR1 HF1 HS1 HR1

Fire Control	Stabilization	Armament	Ammunition
+2	None	4xStinger launchers, M3	8xStinger SAMs, 500x.50BMG

**AN/TWQ-1 HMMWV Avenger**

Notes: In the mid-1980s, General Electric developed an ADA vehicle based on the HMMWV chassis to fill an Army requirement for a light air defense vehicle. The Avenger's only difference from a standard HMMWV is the mounting of a Pedestal- Mounted Stinger System (PMSS) in the cargo bed. The PMSS is a turret housing four twin-tube Stinger launchers (8 tubes altogether) along with an M2HB machinegun. Since the turret's aiming systems are computer-controlled, firing Stingers from a PMSS is an Average (Tac Missile + Computer) task.

The Avenger is used by the US Army, and previously used by the US Marines. Other operators include Bahrain, Egypt, Iraq, Taiwan, and Ukraine.

Avengers have been tested with Starstreak SAMs mounted in place of the Stingers; in this configuration, one Stinger pod is replaced by a pod of Starstreak missiles. This addresses the Stinger's problem with low-contrast targets like hovering helicopters, which are sometimes not detected by Stinger seekers. The Starstreak system was tested as a possible light SAM solution for Britain in 1990-91, though ultimately it was decided not to go ahead with the program.

Avengers have also been tested with the quad pods of Stingers replaced by triple Mistral pods. One prototype was built in 1992 and experimented until 1997, when it was dropped. This variant was originally built to a French requirement.

The Avenger DEW (Directed Energy Weapon), also known as the Laser Avenger, replaced the right Stinger pod with a 1kw laser for use against UAVs and UXO. The M3 was also replaced by an M242 25mm chain gun, along with an increased ammunition supply. As of December 2022 this modification is still being experimented with.

The Avenger Multirole Weapon System (MWS) relocates the M3 to a remote turret above the cab, and replaces one Stinger pod with a pod for two Javelin ATGMs. This is also still being experimented with, but by GDLS instead of the Army.

The Avenger AI3 (Accelerated Improved Interceptor Initiative) replaces both Stinger pods with a pair of AIM-9 Sidewinder missiles. The Army decided against the AI3 in 2013, but General Dynamics is still experimenting with the AI3, hoping for foreign sales.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Avenger	\$260,523	D, G, A	173 kg	3.9 tons	2	7	FLIR, Image Intensification	Open
Avenger Starstreak	\$278,258	D, G, A	173 kg	3.92 tons	2	7	FLIR, Image Intensification	Open
Avenger Mistral	\$198,419	D, G, A	173 kg	3.93 tons	2	7	FLIR, Image Intensification	Open
Avenger DEW	\$463,884	D, G, A	173 kg	4.14 tons	2	9	FLIR, Image Intensification	Open
Avenger MWS	\$282,916	D, G, A	173 kg	3.89 tons	2	8	FLIR, Image Intensification	Open
Avenger AI3	\$205,509	D, G, A	173 kg	3.98 tons	2	9	FLIR, Image Intensification	Open

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
Avenger	249/126	69/35	95	50	Trtd	W(2)	TF1 TS1 TR1 HF1 HS1 HR1
Avenger Starstreak	249/126	69/35	95	50	Trtd	W(2)	TF1 TS1 TR1 HF1 HS1 HR1
Avenger Mistral	249/126	69/35	95	50	Trtd	W(2)	TF1 TS1 TR1 HF1 HS1 HR1
Avenger DEW	236/119	65/33	95	50	Trtd	W(2)	TF1 TS1 TR1 HF1 HS1 HR1
Avenger MWS	249/126	69/35	95	50	Trtd	W(2)	TF1 TS1 TR1 HF1 HS1 HR1
Avenger AI3	244/123	68/34	95	50	Trtd	W(2)	TF1 TS1 TR1 HF1 HS1 HR1

Vehicle	Fire Control	Stabilization	Armament	Ammunition
Avenger	+2	Fair	8xStinger Launchers, M3P	8xStinger, 650x.50
Avenger Starstreak	+2	Fair	4xStinger Launchers, 4xStarstreak Launchers, M3P	4xStinger, 4xStarstreak, 650x.50
Avenger Mistral	+2	Fair	6xMistral Launchers, M3P	6xMistral, 650x.50
Avenger DEW	+2	Fair	4xStinger Launchers, 1kw Solid-State Laser, M242 25mm Chain Gun	4xStinger, 650x25mm
Avenger MWS	+2	Fair	4xStinger Launchers, 2xJavelin Launchers, M3P	4xStinger, 2xJavelin, 650x.50

Avenger AI3	+2	Fair	2xAIM-9L Sidewinder Launchers, M3P	2xSidewinder, 650x.50
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**HUMRAAM**

Notes: This vehicle is a ground mounting of the AMRAAM air-to-air missile on a HMMWV chassis, for use as a light SAM mounting. The mounting is also known as a SLAMRAAM (Surface-Launched AMRAAM). This consists of a 5-missile launcher on an elevating ramp on the back of the HMMWV, and uses the active radar in the nose of the weapon to guide the missile, or the radar of an accompanying vehicle. If only the active radar is used, the AMRAAMs range is limited to 21,000 meters. The rotating mechanism is the same as used on the HMMWV Avenger. This vehicle is still being tested in 2004, mostly by the US Marines.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$627,218	D, A	150 kg	4.13 tons	3	6	Image Intensification (G)	Open

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
236/119	65/33	95	50	Trtd	W(2)	TF1 TS1 TR1 HF1 HS1 HR1

Fire Control	Stabilization	Armament	Ammunition
+2	None	5xAIM-120A AMRAAM Launchers	5xAMRAAM

**LAV-150 ADA Vehicle**

Notes: This is basically a PIVAD turret mounted on a LAV-150 chassis. The hull is almost the same externally, but the turret is the same as the turret of the M163 PIVAD vehicle. The interior is much modified to accommodate the turret and its mechanism and racks for additional ammunition. The PIVAD turret provides a small range-only radar keyed to the range of the Vulcan and rudimentary IR sights, and an optical lead sight. To stabilize the light chassis, three outriggers may be extended before firing, one to the front and one to each rear corner. The engine is a 275-horsepower diesel, the same engine as on the M113 APC, coupled to a manual or automatic transmission depending upon the wishes of the user. (The Saudis use an automatic transmission.)

The LAV-150 ADA was developed for the Saudi National Guard and is not known to be in use by another other entity.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$110,490	D, A	235 kg	9 tons	3	8	Passive IR (D, G), Radar (6 km) (G)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
223/113	62/31/6	303	102	Trtd	W(3)	TF4 TS4 TR3 HF5 HS3 HR2

Fire Control	Stabilization	Armament	Ammunition
+1	None	20mm M130 Vulcan Autocannon	400x20mm

**LAV-150 SAM Vehicle**

Notes: This is an RBS-70 launcher mounted on an elevating pedestal in the rear of a LAV-150 vehicle. This pedestal is not a turret and is merely a launcher which is raised out of the armor envelope on an electrically-actuated pedestal while aiming and firing. Normally, the pedestal is lowered again after a shot and the roof hatches closed, but this is not required for movement. The machinegun is mounted ahead of the roof hatches on a pintle mount at the commander's hatch. This vehicle was originally designed as a light SAM vehicle for SAAB for international sales, but they did not attract any interest.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$175,080	D, A	257 kg	7.6 tons	4	5	Passive IR (D, G), Image Intensification (G)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
259/130	72/36/7	303	102	Stnd	W(3)	HF5 HS3 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	RBS-70 launcher, MAG (C)	8xRBS-70 missiles, 2400x7.62mm

**LAV-300 ADA Vehicle**

Notes: This is similar in concept to the LAV-150 ADA Vehicle, but based on a larger LAV-300 chassis. The hull is almost the same as the LAV-300 APC externally, but the turret is the same as the turret of the M163 PIVAD vehicle. The interior is much modified to

accommodate the turret and its mechanism and racks for additional ammunition. The PIVAD turret provides a small range-only radar keyed to the range of the Vulcan and rudimentary IR sights, and an optical lead sight. The engine is a 270-horsepower Cummins 6 CTA 8.3 turbocharged diesel engine, coupled to an automatic or manual transmission depending upon the wishes of the buyer. Along with the rest of the LAV-300 line, the LAV-300 ADA vehicle ended manufacture in 2020, though used examples are available all over the world.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$129,002	D, A	300kg	12 tons	3	8	Passive IR (D, G), Radar (6 km) (G)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor		
173/87	48/24/5	435	101	Trtd	W(3)	TF4	TS4	TR3 HF8 HS5 HR4

Fire Control	Stabilization	Armament	Ammunition
+1	Fair	20mm M130 Vulcan Autocannon	800x20mmVulcan

**BOV-3**

Notes: This is a Yugoslavian self-propelled anti-aircraft gun on the chassis of the BOV-M armored personnel carrier. Instead of passengers, the vehicle carries ammunition and crew for the triple 20mm autocannons. The driver and commander are on the front left and right, with a two-man turret in the center of the vehicle, and engine at the rear. This vehicle was used just as often against ground units, particularly massed infantry and for reconnaissance by fire. As the guns are not radar directed, it is primarily a clear-weather system, though night vision is available. The BOV chassis uses a 150-horsepower diesel of German make, with a manual transmission and 4x4 suspension.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$107,248	D, A	534 kg	9.4 tons	4	9	Active IR (D, G)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor	
129/65	36/18	220	54	Trtd	W(3)	TF2	TS2 TR2 HF3 HS2 HR2

Fire Control	Stabilization	Armament		Ammunition
+1	Basic	M-55 20/3 Triple 20mm autocannons		1500x20mm

**BOV-30**

Notes: This is a newer version of the BOV-3, this time with a turret mounting twin 30mm Czech-designed autocannons.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$126,039	D, A	538 kg	9.4 tons	4	9	Active IR (D, G)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor	
129/65	36/18	220	54	Trtd	W(3)	TF3	TS3 TR3 HF3 HS2 HR2

Fire Control	Stabilization	Armament		Ammunition
+2	Basic	Twin M-53 30mm autocannons		1000x30mm