

TRACKED SELF-PROPELLED ANTI-AIRCRAFT

Brazilian Tracked SP Anti-aircraft

British Tracked SP Anti-aircraft

Canadian Tracked SP Anti-aircraft

Chinese Tracked SP Anti-aircraft

Czech Tracked SP Anti-aircraft

Egyptian Tracked SP Anti-aircraft

Finnish Tracked SP Anti-aircraft

French Tracked SP Anti-aircraft

German Tracked SP Anti-aircraft

Israeli Tracked SP Anti-aircraft

Italian Tracked SP Anti-aircraft

Japanese Tracked SP Anti-aircraft

Lebanese Tracked SP Anti-aircraft

Pakistani Tracked SP Anti-aircraft

Polish Tracked SP Anti-aircraft

Russian Tracked SP Anti-aircraft

Salvadoran Tracked SP Anti-aircraft

South Korean Tracked SP Anti-aircraft

Swedish Tracked SP Anti-aircraft

Turkish Tracked SP Anti-aircraft

US Tracked SP Anti-aircraft

X-1A Antiaircraft Vehicle

Notes: This Brazilian vehicle is an X-1A light tank with the turret replaced with one mounting an M-55 Quad .50 antiaircraft machinegun. This vehicle was designed for antiaircraft use, but more often found use as an antipersonnel/light vehicle weapon.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|----------|-----------|--------|-----------|------|-----|--------------|--------------|
| \$48,352 | D, A | 400 kg | 14.2 tons | 4 | 6 | Headlights | Enclosed |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------|
| 142/58 | 36/25 | 320 | 103 | Trtd | T3 | TF2 TS2 TR1 HF8 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|--------------------------|------------|
| +1 | Basic | M-55 Quad .50 Machinegun | 2500x.50 |

Stormer Starburst/Starstreak

Notes: These vehicles exist, but the machinegun used is an M-2HB.

Twilight 2000 Notes: The Stormer Starburst is a Stormer armored personnel carrier with a turret similar to the Stormer Starstreak below, but mounting Starburst SAMs instead. The turret was also tested on an AMX-10P, M-113A2, and BTR-50 chassis, but only a single prototype each of these vehicles were made for demonstration purposes. The Stormer Starburst was produced at the same time and in the same factories as the Stormer Starstreak, but in greater numbers because it was cheaper and used cheaper missiles.

The Stormer Starstreak is an ADATS version of the Stormer, mounting a turret with a BRG-15 MG and 8 hypervelocity missile tubes.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|------------|-----------|--------------|--------|-----------|------|-----|------------------------------------|--------------|
| Starburst | \$283,436 | D, G, AvG, A | 400 kg | 10.6 tons | 4 | 6 | Passive IR, Thermal Imaging, Radar | Enclosed |
| Starstreak | \$296,336 | D, G, AvG, A | 410 kg | 10.4 tons | 4 | 6 | Passive IR, Thermal Imaging, Radar | Enclosed |

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|--------|---------|----------|-----------|--------|------|-------------------------|
| (Both) | 140/98 | 35/25/5 | 405 | 89 | CiH | T3 | TF6 TS6 TR6 HF8 HS4 HR4 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|---------|--------------|---------------|----------|------------|
| | | | | |

| | | | | |
|------------|----|-------|------------------------------------|--------------------------------|
| Starburst | +2 | Basic | 8xStarburst SAM Launchers, BRG-15 | 20xStarburst SAMs, 500x15.2mm |
| Starstreak | +2 | Basic | 8xStarstreak SAM Launchers, BRG-15 | 24xStarstreak SAMs, 500x15.2mm |

Tracked Rapier

Notes: This is a modified form of the ground-mounted Rapier SAM pedestal mounted on a highly modified M-548 tracked load carrier. The carrier is lightly armored and thin armor is added to the Rapier mount. The mount is supplied with some degree of stabilization and fire control to allow some degree of fire on the move. Originally designed for the needs of the Iranian Army in the late 1970s, the Tracked Rapier was cancelled by the new Iranian government after it cut ties with Western countries after the revolution. The British Army bought the 50 systems that were already built, and then ordered another 20, then in the early 1990s, ordered series production of the vehicle. The basic M-548 chassis remains intact, with a cab with doors on each side and a roof hatch with a weapon mount. A 60kW APU is located behind the cab to power the weapon systems when the engine is not on. The gunner has a weapons station in the cab linked with the launcher. The Tracked Rapier retains the M-548's amphibious capabilities, but does not have NBC sealing.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|------------|------|-----|-------------------|--------------|
| \$133,134 | D, A | 500 kg | 14.01 tons | 3 | 8 | Radar, Passive IR | Enclosed |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------|
| 112/78 | 28/20/3 | 398 | 72 | Trtd | T2 | TF2 TS2 TR2 HF2 HS2 HR2 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|-------------------------------|----------------------------|
| +4 | Basic | 4xRapier Launchers, L-7A2 (C) | 8xRapier SAMs, 1000x7.62mm |

M-113/ADATS

Notes: This mounting of the ADATS missile is used by Canada and the US. It was designed as a mobile air defense/antitank system that can keep up with advancing infantry and with more effectiveness than the Chaparral and M-901 ITV systems. The system consists of eight ADATS tubes in a turret on top of the M-113 chassis, and is equipped with radar, FLIR, and fire-control devices.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|-----------|------|-----|-------------------------|--------------|
| \$372,349 | D, A | 500 kg | 15.8 tons | 3 | 9 | Radar, FLIR, Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------|
| 117/81 | 29/20/2 | 360 | 93 | Trtd | T2 | TF5 TS4 TR4 HF6 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|-------------------|-------------------|
| +3 | Basic | 8xADATS Launchers | 16xADATS Missiles |

Type 63

Notes: This self-propelled anti-aircraft vehicle is one of the oldest still in the Chinese inventory, and it is also still used by Vietnam. The vehicle consists of a T-34 tank chassis topped with an open turret mounting twin 37mm autocannons. The traverse on the turret and the elevation mechanism on the guns are both manual, so they are slow.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|---------|------|-----|--------------|--------------|
| \$123,942 | D, A | 500 kg | 32 tons | 4 | 10 | Active IR | Enclosed |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-----------------------------|
| 120/84 | 30/21 | 590 | 185 | Trtd | T4 | TF22 TS8 TR7 HF56 HS14 HR10 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|--------------------------------|-----------------------|
| +1 | None | 2x37mm Autocannons, PKT (Hull) | 350x37mm, 1200x7.62mm |

Type 69-37-2

Notes: This is a Type 69 tank with the turret replaced with one mounting twin 37mm autocannons. This is a clear-weather-only system, as no radar is provided (a few rare Type 69-37-2s do have radar). The commander is seated on the left inside the turret and the gunner is on the right, with the autocannons between them.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|----------|-----------|-----------|--------|---------|------|-----|--------------|--------------|
| No Radar | \$111,397 | D, A | 800 kg | 35 tons | 3 | 11 | Passive IR | Enclosed |

| | | | | | | | | |
|-------|-----------|------|--------|---------|---|----|-------------------|----------|
| Radar | \$151,397 | D, A | 800 kg | 35 tons | 3 | 13 | Radar, Passive IR | Enclosed |
|-------|-----------|------|--------|---------|---|----|-------------------|----------|

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|----------|--------|---------|----------|-----------|--------|------|----------------------------|
| No Radar | 126/88 | 32/22 | 935 | 215 | Trtd | T6 | TF16 TS6 TR6 HF40 HS10 HR8 |
| Radar | 122/84 | 31/21 | 935 | 215 | Trtd | T6 | TF16 TS6 TR6 HF40 HS10 HR8 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|----------|--------------|---------------|-----------------------|------------|
| No Radar | +1 | None | Twin 37mm Autocannons | 500x37mm |
| Radar | +2 | None | Twin 37mm Autocannons | 500x37mm |

Type 80

Notes: This is an older Chinese self-propelled anti-aircraft gun, similar to the Russian ZSU-57-2, being a large, open-topped turret mounting twin S-60 autocannons on a Type 69-II tank chassis. Slightly larger than the ZSU-57-2, it carries more ammunition, has better gun stabilization, and better sights. There is a wire cage on the rear of the turret for the crew to deposit empty shell casings and links. Unlike most other Chinese weapons and vehicles, the Type 80 was not exported.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|---------|------|-----|--------------|--------------|
| \$131,161 | D, A | 550 kg | 31 tons | 6 | 11 | Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|----------------------------|
| 136/96 | 34/24 | 935 | 215 | Trtd | T6 | TF16 TS6 TR6 HF40 HS10 HR8 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|----------------------------|------------|
| +1 | Fair | 2x57mm S-60 autocannons | 400x57mm |

BVP-1 Strop

Notes: As Czechoslovakia's M-53/59 self-propelled antiaircraft guns based on an armored truck chassis were getting old and the truck chassis were not very mobile off-road, Czechoslovakia decided to start, in the mid-1980s, to remove the antiaircraft guns from the M-53/59s and placing them on the chassis of BVP-1 infantry fighting vehicles, which were being phased out in favor of BVP-2s. A new commander's hatch is installed to the front right of the turret, which is further to the rear than on a BVP-1. The turret is a two-man version, but it has no hatches, and the crew enters through the rear doors. Besides Czechoslovakia, this vehicle has also been seen in the hands of Angolan and Cuban soldiers.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|------------|------|-----|-----------------------|--------------|
| \$798,052 | D, A | 400 kg | 14.68 tons | 4 | 6 | Active/ Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------|
| 126/88 | 32/22/3 | 460 | 111 | Trtd | T2 | TF3 TS3 TR2 HF8 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|-------------------------|------------|
| +2 | Fair | 2x30mm M-53 Autocannons | 1000x30mm |

Sinai-23

Notes: This is an Egyptian modification of the M-113A3 armored personnel carrier. In this role, the M-113 is fitted with a turret mounting twin ZU-23 autocannons and four launchers for Sakr Eye SAMs (an Egyptian improved SA-7 Grail SAM). The vehicle also has a radar set and a fire control computer with stabilization for the guns.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|---------|------|-----|-------------------|--------------|
| \$148,877 | D, A | 300 kg | 12 tons | 4 | 7 | Radar, Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------|
| 110/78 | 28/20/3 | 360 | 114 | Trtd | T2 | TF5 TS5 TR5 HF6 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|---|----------------------------|
| +3 | Fair | Twin 23mm ZU-23 autocannons, 4xSakr Eye Launchers | 1400x23mm, 6xSakr Eye SAMs |

T-55/Marksman

Notes: This is a Finnish self-propelled antiaircraft gun using a T-55 chassis with a GEC-Marconi Marksman turret (the same turret fitted to the German Gepard AAA gun). The T-55/Marksman is radar-equipped and all upgrades were completed by 1993.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|---------|------|-----|------------------------------|--------------|
| \$189,168 | D, A | 500 kg | 36 tons | 4 | 13 | Radar, Active/ Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|-------------|-----------|--------|------|--------------------------------|
| 114/80 | 29/20 | 812 +380 | 192 | Trtd | T6 | TF27 TS10 TR6 HF67 HS16 HR8 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|---------------------------|------------|
| +4 | Fair | Twin 35mm KDA Autocannons | 240x35mm |

AMX-13 DCA

Notes: This is the hull of the AMX-13 light tank topped with a large turret housing an antiaircraft gun system. They are generally used in a mix with SP antiaircraft missile systems to provide a layered mix of weapons. They are fairly light vehicles with decent armor (especially against civilians and under-equipped partisans) and good maneuverability. There is a driver's hatch on the front deck, and a commander's hatch on the turret deck; the gunner uses the commander's hatch. The hull can use the same appliqué armor as the standard AMX-13 light tank.

Twilight 2000 Notes: In the Twilight War, the AMX-13 DCAs were used to grisly effect in the Middle East and the Dead Zone against personnel in the open and in soft skinned vehicles, and used to terrorize and kill refugees in the Dead Zone along the Franco-German border, as well as against partisans in Belgium, Luxembourg, and the Netherlands.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|-----------|------|-----|-------------------|--------------|
| \$102,450 | G, A | 300 kg | 17.2 tons | 3 | 8 | Radar, Passive IR | Enclosed |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------|
| 88/62 | 22/16 | 415 | 139 | Trtd | T3 | TF5 TS4 TR3 HF6 HS3 HR2 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|-----------------------|------------|
| +2 | Fair | 2x 30mm Giat 30 M 781 | 600x30mm |

Roland/AMX-30

Notes: This is the same Roland SAM turret as on the Roland SPAA featured in the *NATO Combat Vehicle Handbook*, but mounted on a modified AMX-30 tank chassis. It is used by France, Iraq, Qatar, and Spain. Missile launchers are automatically reloaded when empty. The Roland system has both night vision and self-contained radar for the missiles, and may be fired by optical tracking in a heavily jammed environment.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|---------|------|-----|------------------------|--------------|
| \$228,490 | D, G, A | 500 kg | 34 tons | 4 | 13 | Thermal Imaging, Radar | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|---------|----------|-----------|--------|------|---------------------------|
| 144/100 | 36/25 | 970 | 253 | Trtd | T6 | TF12 TS5 TR3 HF30 HS8 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|----------------------------------|-------------------------------|
| +3 | None | Twin Roland Launcher, AAT-F1 (C) | 8xRoland Missiles, 750x7.62mm |

Shahine

Notes: This is a self-propelled SAM launcher built by France. The system consists of Crotale SAMs mounted on a modified AMX-30 main battle tank chassis. The system has radar that can track 18 targets at once and engage two of them at a time with missiles. The vehicle is normally followed by a number of heavy trucks equipped with extra missiles and a crane for reloading the launcher.

The second part of Shahine is a target acquisition unit. This is a radar vehicle mounted on a modified AMX-30 chassis. The radar vehicle can track up to 40 targets at once at a range of 18.5 km. It feeds data to the Shahine firing unit through a radio link.

Twilight 2000 Notes: The French did not use this system before the Twilight War, but was instead used only by Saudi Arabia; shipments were diverted when the Foreign Legion deployed to the Middle East, for use by those forces.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|----------------|-----------|-----------|--------|---------|------|-----|-------------------|--------------|
| Firing Vehicle | \$286,291 | D, G, A | 400 kg | 38 tons | 4 | 14 | Passive IR, Radar | Shielded |

| | | | | | | | | |
|---------------|-----------|---------|--------|-----------|---|----|-------------------|----------|
| Radar Vehicle | \$174,452 | D, G, A | 500 kg | 32.7 tons | 4 | 12 | Passive IR, Radar | Shielded |
|---------------|-----------|---------|--------|-----------|---|----|-------------------|----------|

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|----------------|---------|---------|----------|-----------|--------|------|------------------------------|
| Firing Vehicle | 130/90 | 33/23 | 970 | 245 | Trtd | T6 | TF12 TS5 TR3 HF30 HS8 HR4 |
| Radar Vehicle | 146/102 | 37/26 | 970 | 250 | CiH | T6 | TF2 TS2 TR2 HF30 HS8 HR4 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|----------------|--------------|---------------|-------------------------|--------------------|
| Firing Vehicle | +4 | None | 6xCrotale SAM Launchers | 6xCrotale Missiles |
| Radar Vehicle | None | None | AAT-F1 (C) | 1000x7.62mm |

Gepard

Notes: This is a *flakpanzer* (antiaircraft tank) used by Germany, the Netherlands (where it is known as the CA-1), and Belgium. The turret, called the Marksman, is also used on a T-55 chassis by Finland and on a G-6 chassis by South Africa. The Gepard itself is basically a much-modified Leopard 1 chassis topped with a large turret housing the antiaircraft gun system, including a radar for search purposes and a shorter-ranged radar for tracking targets and directing the guns. It has a superficial resemblance to the ZSU-57-2, but as the latter system was not encountered much in Europe and the Gepard was rare in areas where the ZSU-57-2 was common, few mistakes were made. Dutch CA-1s are easily distinguished by their differently-shaped radars; the CA-1's search radar is T-shaped, and the tracking radar has a larger dish, and in addition, there are typically 4 smoke grenade launchers on each side of the turret on German and Belgian Gepards, while there are 6 smoke grenade launchers on each side of the CA-1's turret. Otherwise, there is a driver's hatch on the front right deck, and a commander's hatch on the turret deck.

Twilight 2000 Notes: It was common to put a weapon mount by the commander's hatch, but Gepards were not issued that way.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------------|-----------|--------------|--------|-----------|------|-----|---|--------------|
| Standard | \$251,443 | D, G, AvG, A | 500 kg | 47.3 tons | 3 | 14 | Radar, Passive IR | Shielded |
| Late Production | \$342,443 | D, G, AvG, A | 500 kg | 47.4 tons | 3 | 14 | Radar, Passive IR, Image Intensification, Thermal Imaging | Shielded |

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|--------|---------|----------|-----------|--------|------|----------------------------|
| (Both) | 126/88 | 32/22 | 985 | 293 | Trtd | T6 | TF15 HS6 TS6 HF38 HS10 HR8 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|----------|--------------|---------------|------------------------|------------|
| Standard | +4 | Fair | 2x35mm KDA Autocannons | 660x35mm |

| | | | | |
|-----------------|----|------|------------------------|----------|
| Late Production | +4 | Good | 2x35mm KDA Autocannons | 660x35mm |
|-----------------|----|------|------------------------|----------|

Ozelot

Notes: This is a Wiesel light combat vehicle fitted with a turret mounting a SAM launcher. Either Stingers or SA-16s may be used. The launcher has four tubes, and these weapons may be dismounted and used separate from the vehicle. The turret is also equipped with a passive air defense alert device.

There is also a version of the Ozelot, known as the platoon/battalion command post, which has no missiles, but instead has a rotary 3-D radar of Swedish make, known as HARD (Helicopter and Airplane Radio/radar Detection). These vehicles are normally linked to the Ozelot SAM vehicles. This allows a fire control rating of +2.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|---------------|-----------|-----------|--------|-----------|------|-----|-------------------|--------------|
| SAM Vehicle | \$111,806 | D, A | 300 kg | 4.2 tons | 3 | 3 | Passive IR | Enclosed |
| Radar Vehicle | \$67,095 | D, A | 300 kg | 4.13 tons | 3 | 6 | Radar, Passive IR | Enclosed |

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|---------|---------|----------|-----------|--------|------|-------------------------|
| (Both) | 158/110 | 40/28 | 450 | 40 | Trtd | T3 | TF1 TS1 TR1 HF4 HS2 HR2 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|---------------|--------------------------------------|---------------|------------------------------|-------------------------|
| SAM Vehicle | +1 (+2 if linked with radar vehicle) | None | 4xStinger or SA-16 Launchers | 8xStinger or SA-16 SAMs |
| Radar Vehicle | None | None | MG-3 (C) | 450x7.62mm |

Radarpanzer

Notes: This is a modified Marder IFV fitted with a raised roofline and a turntable mounting a Siemens air defense radar system. The radar can be raised 10 meters above ground level, and has a range of 30 km. The vehicle is primarily meant to provide targeting information for Roland and Gepard air defense systems, but may be used with other air defense systems.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|---------|------|-----|--------------------------|--------------|
| \$109,205 | D, A | 400 kg | 35 tons | 4 | 14 | Radar, Passive/Active IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|--------------------------|
| 112/78 | 28/20/3 | 652 | 217 | Trtd | T4 | TF2 TS2 TR2 HF15 HS6 HR6 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|----------|-------------|
| None | None | MG-3 (C) | 2500x7.62mm |

Roland 2/Roland 3/Marder

Notes: This is the Roland surface-to-air missile system mounted on the chassis of the Marder IFV. The Marder is heavily modified for this role, not only using a different turret, but also carrying automatic reloading machinery in the rear of the vehicle instead of passengers. The Roland 2 and 3 are similar, but the Roland 3 has four missiles launching tubes instead of two. The result is an accurate SAM vehicle that can keep up with armored formations and is used for their protection. The commander and driver's hatch are on the front deck; the turret and the gunner have no hatch. The rear ramp is deleted, as are the firing ports.

Twilight 2000 Notes: Besides the Germans, this system was also used by Brazil in the Twilight War.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|----------|-----------|-----------|--------|-----------|------|-----|--|--------------|
| Roland 2 | \$190,183 | D, A | 500 kg | 32.5 tons | 3 | 14 | Radar, Passive IR, Image Intensification | Shielded |
| Roland 3 | \$228,411 | D, A | 500 kg | 33 tons | 4 | 14 | Radar, Passive IR, Image Intensification | Shielded |

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|--------|---------|----------|-----------|--------|------|-------|
|---------|--------|---------|----------|-----------|--------|------|-------|

| | | | | | | | |
|--------|--------|---------|-----|-----|------|----|-----------------------------|
| (Both) | 118/84 | 30/21/3 | 652 | 217 | Trtd | T4 | TF2 TS2 TR2 HF15 HS6 HR6 |
|--------|--------|---------|-----|-----|------|----|-----------------------------|

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|----------|--------------|---------------|------------------------------|-----------------------------|
| Roland 2 | +3 | None | 2xRoland Launchers, MG-3 (C) | 10xRoland SAMs, 1200x7.62mm |
| Roland 3 | +3 | None | 4xRoland Launchers, MG-3 (C) | 10xRoland SAMs, 1200x7.62mm |

Machbet

Notes: This is an Israeli variation of the M-741A6 PIVADS vehicle, used only by that country. It is almost identical to the M-163, but atop the turret is a launching box with 4 Stinger launchers. This vehicle was a surprise to enemy pilots who felt they had spotted a standard PIVAD and thought they were out of range of it.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|------------|------|-----|-------------------|--------------|
| \$194,236 | D, A | 200 kg | 12.43 tons | 3 | 7 | Passive IR, Radar | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------|
| 106/74 | 27/19/3 | 360 | 98 | Trtd | T2 | TF3 TS3 TR3 HF6 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|--|------------------------------|
| +2 | Basic | 20mm M-163 Vulcan Autocannon, 4xStinger Launchers | 1800x20mm, 8xStinger SAMs |

Otomatic

Notes: This is a heavy anti-aircraft gun built on the chassis of the Leopard 1 tank, many of which the Italians had after adopting the C-1 Ariete in the early 1990s. The regular tank turret is removed and replaced with a larger turret mounting a 76mm radar-directed anti-aircraft gun known as the OTO-Breda Super Rapid, a gun more normally found on ships rather than land mountings. The fire control equipment is advanced, with radar ranging and computer-controlled acquisition, with laser sights and backup TV sights and optical sights for use against land vehicles. The vehicle also incorporates a laser designator for use in conjunction with units firing laser-guided missiles. The Otomatic is equipped with a very efficient fire suppression system, NBC overpressure and radiological shielding, and an APU to generate power when the engine is switched off.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|--------------|--------|---------|------|-----|--------------------------|--------------|
| \$214,461 | D, G, AvG, A | 500 kg | 47 tons | 4 | 15 | Radar, Active/Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|------------------------------|
| 124/86 | 31/22 | 985 | 285 | Trtd | T6 | TF30 TS12 TR11 HF38 HS10 HR8 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|---|----------------------|
| +4 | Fair | 76mm OTO-Breda Autocannon, MG-43/59 (C) | 90x76mm, 1000x7.62mm |

SIDAM-25

Notes: This is a light anti-aircraft system based on the M-113 chassis. A turret is added, with quadruple 25mm KBA autocannons. In addition, the engine is replaced with a more powerful engine, and the fuel tanks are moved to the rear, on either side of the ramp (in the same manner as the M-113A3).

The SIDAM-25/Mistral is a rare Italian air defense vehicle that is a standard SIDAM-25 with three launchers for Mistral SAMs mounted above each bank of autocannons. Sights appropriate for the missiles are added along with an enhanced night vision suite. The first of these modifications was done in late 1996, so they are relatively rare.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|----------------------|-----------|-----------|--------|-----------|------|-----|--|--------------|
| SIDAM-25 | \$100,679 | D, A | 200 kg | 15.1 tons | 3 | 6 | Passive IR | Shielded |
| SIDAM-25/ Mistral | \$316,863 | D, A | 200 kg | 15.3 tons | 3 | 7 | Passive IR, Thermal Imaging, Image Intensification | Shielded |

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|----------------------|--------|---------|----------|-----------|--------|------|----------------------------|
| SIDAM-25 | 96/66 | 24/17/3 | 360 | 99 | Trtd | T2 | TF5 TS5 TR5 HF6 HS4 HR4 |
| SIDAM-25/ Mistral | 92/64 | 23/16/2 | 360 | 99 | Trtd | T2 | TF5 TS5 TR5 HF6 HS4 HR4 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|----------------------|--------------|---------------|--|------------------------------|
| SIDAM-25 | +2 | Fair | 4x25mm KBA Autocannons | 1400x25mm |
| SIDAM-25/ Mistral | +3 | Fair | 4x25mm KBA Autocannons, 6xMistral Launchers | 1400x25mm, 6xMistral SAMs |

Type 87

Notes: This is a Japanese self-propelled antiaircraft gun based on the chassis of the Type 74 tank. The turret is similar to the German Gepard gun, and the autocannons used are the same as that vehicle. The guns are radar-directed.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|---------|------|-----|-------------------|--------------|
| \$153,461 | D, A | 500 kg | 44 tons | 4 | 14 | Radar, Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------------|
| 128/90 | 32/23 | 950 | 278 | Trtd | T6 | TF22 TS8 TR7 HF56Sp HS14 HR10 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|-----------------------------------|-------------------|
| +4 | Fair | 2x35mm KDA Autocannons, M-2HB (C) | 600x35mm, 500x.50 |

M-113A1/ZU-23-2

Notes: This jury-rigged vehicle is a local modification by Lebanese forces. It is an M-113A1 with a ZU-23-2 anti-aircraft gun installed on the rear deck. The rear deck hatch is retained, as is the rear ramp, but the commander's hatch is blocked by the gun installation. The base vehicle is largely unchanged and can be easily converted back to the APC version, and with a limited ammunition load can still be used in that role. Ammunition in this vehicle is normally carried in cans or in the crates the ammunition is shipped in, but some have been modified with improvised racks. Elevation and traverse are manual and unable to keep up with fast aircraft; as such, the vehicle is normally used against helicopters or in a ground support role. There is a gun shield on the front of the weapon, but otherwise, the crew operating the gun is unprotected.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|----------|-----------|-------|------------|------|-----|--------------|--------------|
| \$58,621 | D, A | 1 ton | 11.95 tons | 4 | 5 | Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------|
| 108/76 | 27/19 | 360 | 98 | Trtd | T2 | TF2 TS0 TR0 HF6 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|-------------------------------|------------|
| +1 | None | ZU-23-2 Twin 23mm Autocannons | 1100x23mm |

M-113/Anza

Notes: This is a Pakistani development of the M-113A1, with a turret mounting a quadruple launcher for the Anza 1 (copy of the Chinese HN-5 SAM) and two KPV machineguns. The weapons have a coincidence gunsight, but are not stabilized or otherwise increased in accuracy.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|------------|------|-----|--------------|--------------|
| \$138,580 | D, A | 400 kg | 12.05 tons | 4 | 6 | Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------|
| 108/76 | 27/19/3 | 360 | 98 | Trtd | T2 | TF2 TS2 TR2 HF6 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|-------------------------|--------------------------|
| +1 | None | 4xHN-5 Launchers, 2xKPV | 8xHN-5 SAMs, 1750x14.5mm |

M-113/RBS-70

Notes: This is a Pakistani M-113 with a pedestal in the rear mounting an elevating RBS-70 SAM and a seat for the gunner. The weapon is carried under armor and elevated before launch. The SAM is equipped with a laser rangefinder and sight.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|----------|-----------|--------|------------|------|-----|--------------|--------------|
| \$76,909 | D, A | 400 kg | 11.68 tons | 3 | 6 | Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------|
| 110/78 | 28/20/3 | 360 | 97 | Std | T2 | HF6 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|---------------------------|----------------------------|
| +3 | None | RBS-70 launcher, DShK (C) | 8xRBS-70 SAMs, 2000x12.7mm |

Sopel

Notes: The system is based on a stretched MT-LB, topped with a turret mounting an autocannon and missile launchers. Early versions were armed with SA-7 missiles, but most versions were armed with SA-14 missiles, and a few were made with SA-16 missiles. The early versions have ZU-23 autocannons, but most of the Sopels are armed with 2A38 30mm autocannons (the same as mounted on the ZSO-30-4).

Twilight 2000 Notes: This Polish vehicle began production just before the Twilight War, and as it was produced by the same factories as the BMP-40 and BWP-2000, the production facilities were destroyed early in the war, and few examples of the Sopel were made.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|---------|-----------|-----------|--------|------------|------|-----|-----------------------------|--------------|
| 23mm | \$212,326 | D, A | 500 kg | 16 tons | 3 | 10 | Thermal Imaging, Passive IR | Enclosed |
| 30mm | \$225,110 | D, A | 500 kg | 16.12 tons | 3 | 10 | Thermal Imaging, Passive IR | Enclosed |

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|--------|---------|----------|-----------|--------|------|-------------------------|
| (Both) | 108/79 | 27/19 | 450 | 79 | Trtd | T4 | TF3 TS3 TR3 HF4 HS2 HR2 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|---------|--------------|---------------|--|--|
| 23mm | +3 | Fair | 2x23mm ZU-23 Autocannons, 2xSA-7 or SA-14 Launchers, PKT (C) | 1800x23mm, 8xSA-7 or SA-14 SAMs, 1000x7.62mm |

| | | | | |
|------|----|------|--|--|
| 30mm | +3 | Fair | 2x30mm 2A38 Autocannons, 2xSA-7 or SA- 14 Launchers, PKT (C) | 1800x30mm, 8xSA-7 or SA-14 SAMs, 1000x7.62mm |
|------|----|------|--|--|

BTR-ZD

Notes: This is a BTR-D topped with a turret containing a ZU-23-2 anti-aircraft gun setup. It is designed for local air defense and fire support for airborne and naval infantry units. The turret is open-topped and only has a frontal gun shield. It is not normally found outside of Russian, Polish, and Czech units, though a few were supplied to Iraq before the war.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|----------|-----------|--------|---------|------|-----|-------------------|--------------|
| \$70,376 | D, A | 600 kg | 11 tons | 4 | 4 | Active/Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|---------|----------|-----------|--------|------|-------------------------|
| 164/115 | 38/27/7 | 300 | 88 | Trtd | T4 | TF2 TS0 TR0 HF8 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|---|------------------------|
| +2 | Basic | ZU-23-2 Twin 23mm Autocannon, 2xPKT (Bow) | 1120x23mm, 2000x7.62mm |

SA-4 Ganef ADA

Notes: The Russian designation of this system is the ZRD-SD. It is used by that country and by Bulgaria, Hungary, and Poland. It stretches the limits of the designation "tactical" due to its size, but is used in that role. The complete system includes the launcher described below; a radar vehicle also described below, and Ural-375 trucks for resupply. The radar vehicles are essential; the firing vehicle has no radar or guidance equipment for the missiles. The Long Track tracking radar unit is based on an AT-T chassis, while the Pat Hand fire control radar is based on the same chassis as the Ganef.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------------------|-----------|-----------|--------|------------|------|-----|-------------------|--------------|
| Firing Unit | \$270,039 | D, A | 400 kg | 30 tons | 5 | 16 | Active/Passive IR | Shielded |
| Long Track Radar Unit | \$257,092 | D, A | 400 kg | 27.75 tons | 5 | 14 | Headlights | Shielded |

| | | | | | | | | |
|---------------------|----------|------|--------|---------|---|----|-----------------------|----------|
| Pat Hand Radar Unit | \$73,013 | D, A | 400 kg | 30 tons | 5 | 13 | Active/ Passive IR | Shielded |
|---------------------|----------|------|--------|---------|---|----|-----------------------|----------|

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|-----------------------|--------|---------|----------|-----------|--------|------|----------------------------|
| Firing Unit | 139/97 | 32/23 | 850 | 153 | Trtd | T6 | TF1 TS1 TR1 HF6 HS4 HR4 |
| Long Track Radar Unit | 70/49 | 17/12 | 1415 | 82 | CiH | T4 | TF1 TS1 TR1 HF2 HS2 HR2 |
| Pat Hand Radar Unit | 134/94 | 31/22 | 850 | 146 | CiH | T6 | TF1 TS1 TR1 HF6 HS4 HR4 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|-------------|--------------|---------------|--------------------|-------------|
| Firing Unit | +3 | None | Twin SA-4 Launcher | 2xSA-4 SAMs |
| Radar Units | None | None | PKT (C) | 1000x7.62mm |

SA-6 Gainful

Notes: This Russian SAM vehicle is known as the ZRK-SD Kub in Russian service. (The export version is called the Kvadrat, but is identical.) Two versions exist; the standard SA-6 consists of a radar vehicle and one or more launcher vehicles, while the SA-6b does not require a separate radar vehicle. Reloads are carried by modified Zil-131 trucks. It is also a large missile for a tactical deployment, though not as large as the SA-4. The standard SA-6 vehicle requires a radar vehicle, as it does not carry tracking equipment of its own. This system is used by a variety of countries, including Russia, Algeria, Bulgaria, Cuba, Czechoslovakia, Egypt, Hungary, India, Iraq, Libya, Poland, Romania, Syria, Tanzania, Vietnam, Yemen, and Yugoslavia. The SA-6b version is primarily used by members of the Warsaw Pact and Syria.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|---------|-----------|-----------|--------|------------|------|-----|-----------------------|--------------|
| SA-6a | \$129,983 | D, A | 400 kg | 14 tons | 3 | 10 | Active/ Passive IR | Enclosed |
| SA-6b | \$149,987 | D, A | 400 kg | 14.25 tons | 4 | 11 | Radar, Passive IR | Enclosed |

| | | | | | | | | |
|------------------------------|----------|------|--------|------------|---|----|--------------------------|----------|
| Straight Flush Radar Vehicle | \$96,106 | D, A | 400 kg | 13.95 tons | 3 | 10 | Radar, Active/Passive IR | Enclosed |
|------------------------------|----------|------|--------|------------|---|----|--------------------------|----------|

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|------------------------------|--------|---------|----------|-----------|--------|------|-------------------------|
| SA-6a | 137/96 | 32/22 | 250 | 70 | Trtd | T4 | TF1 TS1 TR1 HF3 HS2 HR2 |
| SA-6b | 135/95 | 32/22 | 250 | 70 | Trtd | T4 | TF1 TS1 TR1 HF3 HS2 HR2 |
| Straight Flush Radar Vehicle | 132/92 | 31/22 | 250 | 70 | CiH | T4 | TF1 TS1 TR1 HF3 HS2 HR2 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|------------------------------|--------------|---------------|----------------------|-------------|
| SA-6a/b | +3 | None | Triple SA-6 Launcher | 3xSA-6 SAMs |
| Straight Flush Radar Vehicle | None | None | PKT (C) | 1000x7.62mm |

SA-13 ADA

Notes: The SA-13 ADA is a tracked, armored, surface-to-air missile system. It carries the SA-13 SAM on an MTLB chassis. The missiles are carried on the top of the vehicle in erectable launcher rails. Some versions have a radar link to an air defense radar. The layout is the same as the MTLB except for the hatches on the rear deck. This vehicle is used by Russia, Afghanistan, Algeria, Bulgaria, Cuba, Czechoslovakia, Hungary, India, Iraq, Jordan, Libya, Poland, and Syria.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|------------|------|-----|------------------|--------------|
| \$176,817 | D, A | 2 tons | 12.08 tons | 4 | 8 | Radar, Active IR | Enclosed |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|---------|----------|-----------|--------|------|-------------------------|
| 146/102 | 34/34/4 | 450 | 83 | Trtd | T3 | TF2 TS2 TR2 HF4 HS2 HR2 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|-----------------------------------|--------------------------|
| None | None | Quadruple SA-13 launcher, PKT (C) | 8xSA-13 SAMs, 750x7.62mm |

SA-15

Notes: This is a newer Russian-made air defense vehicle used by Russia and in small numbers by China (perhaps 15 in all by that country). The vehicle has the missiles and radar contained within it for a self-contained system. The radar can track 48 targets at once and can guide missiles to two targets simultaneously, with tracking range out to 25 km. The SA-15 (known as the ZRK Tor to the Russians) is normally accompanied by one or more resupply vehicles on the same chassis carrying 16 missiles each and a crane for reloading. The chassis is the same as the ZSO-30-4.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|---------|------|-----|------------------------------|--------------|
| \$246,224 | D, A | 600 kg | 34 tons | 3 | 15 | Radar, Image Intensification | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|---------|----------|-----------|--------|------|-------------------------|
| 151/106 | 35/25 | 880 | 271 | Trtd | T4 | TF2 TS2 TR2 HF3 HS2 HR2 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|-----------------------|--------------|
| +3 | None | 8xSA-15 SAM Launchers | 8xSA-15 SAMs |

ZSU-23-4

Notes: The Shilka, as it is known to the Russians, is one of the most common self-propelled anti-aircraft gun systems in the world, being used by over 25 countries in its 35-year history. The chassis is shared by the BTR-50, PT-76, and SA-6 systems. Despite its replacement in many countries by the later 2S6M, the Shilka

was still preferred by many crews due to the massive volume of firepower it could produce, against air as well as ground targets. The turret is known for its fast traverse rate and it was one of the first self-propelled anti-aircraft guns to have radar direction for its weapons. It is also equipped with a land navigation system that greatly helps finding remote places. NATO soldiers often refer to this weapon as the "Zoo-23."

Starting in 1995, at first as an experiment, but later as a standard modification, ZSU-23-4 "Shilka" self-propelled anti-aircraft guns were modified by adding a 3-round launcher for SA-16 surface-to-air missiles above the turret. The missiles are aimed and launched from within the turret. No reloads are carried within the vehicle, though often crates were carried on the rear deck or slung from the sides of the vehicle in the field.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|------------------------|-----------|-----------|--------|------------|------|-----|--|--------------|
| ZSU-23-4 | \$154,659 | D, A | 800 kg | 20.5 tons | 4 | 9 | Radar, Active IR | Enclosed |
| ZSU-23-4 Without Radar | \$125,989 | D, A | 800 kg | 20.87 tons | 4 | 8 | Passive IR, Image Intensification | Enclosed |
| ZSU-23-4 Upgrade | \$191,251 | D, A | 800 kg | 20.53 tons | 4 | 10 | Radar, Passive IR, Image Intensification | Shielded |

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|------------------------|--------|---------|----------|-----------|--------|------|-------------------------|
| ZSU-23-4 | 111/78 | 26/18 | 250 | 74 | Trtd | T3 | TF4 TS4 TR4 HF5 HS3 HR3 |
| ZSU-23-4 Without Radar | 117/82 | 27/19 | 250 | 82 | Trtd | T3 | TF4 TS4 TR4 HF5 HS3 HR3 |
| ZSU-23-4 Upgrade | 116/82 | 27/19 | 250 | 80 | Trtd | T3 | TF4 TS4 TR4 HF5 HS3 HR3 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|----------|--------------|---------------|--------------------|------------|
| ZSU-23-4 | +2 | Fair | 4x23mm Autocannons | 2000x23mm |

| | | | | |
|---------------------------|----|------|--|-----------------------------|
| ZSU-23-4 Without Radar | +2 | Fair | 4x23mm Autocannons | 4000x23mm |
| ZSU-23-2 Upgrade | +3 | Fair | 4x23mm Autocannons, 3xSA-16 Launchers | 2000x23mm, 3xSA- 16 SAMs |

ZSU-57-2

Notes: This is an older anti-aircraft system consisting of twin 57mm S-60 autocannons mounted on a lightened T-55 chassis, distinguished by its four roadwheels instead of five. The turret is open-topped and enlarged to accommodate the gun system. There is a driver's hatch on the left front deck, and he is the only member of the crew to have complete armor protection.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|---------|------|-----|-------------------------|--------------|
| \$196,826 | D, A | 500 kg | 28 tons | 6 | 11 | Active IR (Driver only) | Enclosed |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|---------|----------|-----------|--------|------|----------------------------|
| 146/102 | 34/24 | 812 +280 | 154 | Trtd | T4 | TF10 TS10 TR8 HF12 HS8 HR6 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|----------------------------|------------|
| None | None | Twin 57mm S-60 Autocannons | 316x57mm |

M-114 SPAA

Notes: This odd vehicle has an interesting history. In 1978, El Salvador took delivery of 27 used Woodmaster tractors – essentially M-114s stripped of their armor and rebuilt as agricultural tractors. Mastranza in El Salvador immediately got to work on them, re-plating them and otherwise trying to get into working order. They produced three variants: an APC (which US officials at first mistook for an M-113, as the El Salvadoran APC looks quite similar at first glance), a sort of gun carrier with a turret armed with several machineguns pointing in several directions, and the AAA vehicle. It is believed that no more than four of these vehicles have been built.

The biggest problem that Mastranza had was the engines. The Woodmaster does not have the same engine as the M-114 – it used a different engine, a Chevy V-8 gasoline engine that produces 160 horsepower. The gasoline engines were limited in range, unreliable, prone to breakdowns, and tended to overheat when used in their new role in armored vehicles. Within a year, Mastranza replaced those engines with LDT-465IC V-6 diesels adapted from M-35 2.5-ton trucks. Though the range was improved, speed was decreased, and the engines still regularly overheated. This means that the M-114 SPAA (I don't really know what else to call it) is primarily a reaction or static support weapon rather than being able to keep up with most vehicle convoys to support them in a dynamic roles.

The M-114 SPAA has faces built up with thin armor plate; they are sloped on both the front and sides. There are seats for the driver and commander at the front; these have slits with windows at the front and hatches above them. At the rear is what looks like a ridiculously-large turret, housing a Yugoslavian-built M-55A2 triple-20mm autocannon system (which uses three M-52 autocannons); this system uses manual traverse and elevation. The turret has no back at all.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|---------------|-----------|-----------|--------|------------|------|-----|--------------|--------------|
| Gas Engine | \$119,558 | G, A | 300 kg | 10.4 tons | 3 | 9 | Headlights | Enclosed |
| Diesel Engine | \$119,558 | D, A | 300 kg | 10.89 tons | 3 | 8 | Headlights | Enclosed |

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------------|--------|---------|----------|-----------|--------|------|-------------------------|
| Gas Engine | 91/64 | 20/16 | 303 | 54 | Trtd | T3 | TF3 TS2 TR0 HF5 HS3 HR2 |
| Diesel Engine | 79/55 | 17/14 | 303 | 31 | Trtd | T3 | TF3 TS2 TR0 HF5 HS3 HR2 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|---------|--------------|---------------|-------------------------------|------------|
| (Both) | None | None | 3x20mm M-55 Autocannon Set | 300x20mm |

K-30 Biho

Notes: The Biho (Flying Tiger) is a South Korean anti-aircraft gun that shares a chassis with the Daewoo FAASV (see South Korean Self-Propelled Artillery). The Biho is used to take out aircraft that have penetrated the missile umbrella of more long-range defenses and to provide cover for mechanized forces. It is much more heavily armored than the Daewoo FAASV, and has a high hit probability against even fast-moving aircraft. The twin 30mm guns are radar controlled, and the radar has a tracking range of 7 km.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|---------|------|-----|--------------|--------------|
| \$232,910 | D, A | 500 kg | 25 tons | 4 | 12 | FLIR, Radar | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|---------|----------|-----------|--------|------|-------------------------|
| 144/101 | 34/24 | 500 | 169 | Trtd | T3 | TF6 TS5 TR5 HF8 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|-----------------------------------|-------------------|
| +4 | Good | 2x30mm KCB Autocannons, M-2HB (C) | 600x30mm, 500x.50 |

K-263A1

Notes: This is a KIFV fitted with a PIVAD anti-aircraft gun and associated equipment. The K-263 does not carry passengers; instead, the passenger compartment is taken up with the gun turret and ammunition stowage. The vehicle is equipped with radar and night vision gear.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|-----------|------|-----|-------------------|--------------|
| \$108,276 | D, A | 300 kg | 13.2 tons | 4 | 8 | Radar, Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|---------|----------|-----------|--------|------|--------------------------------|
| 155/108 | 36/25/4 | 400 | 98 | Trtd | T3 | TF2 TS2 TR2 HF8Sp HS5Sp HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|---------------------------------------|--------------------------|
| +3 | Fair | 20mm Vulcan Autocannon, M-60E2 (C) | 1800x20mm, 750x7.62mm |

LvRbBv-701

Notes: Sister vehicle to the PvRbBv-551 tank destroyer, the LvRbBv-701 mounts a RBS-70 surface-to-air missile launcher. The launcher is retracted under armor during traveling, and raised for firing. For details on development, see the PvRbBv-551 under Swedish Self-Propelled Guns.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|-------|----------|------|-----|--|--------------|
| \$154,576 | G, A | 1 ton | 9.7 tons | 4 | 6 | Passive IR, Thermal Imaging, Image Intensification | Enclosed |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------|
| 99/69 | 23/16 | 240 | 76 | Std | T2 | HF3 HS2 HR2 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|------------------------------|---------------------------------|
| None | None | RBS-70 SAM Launcher, MAG (C) | 12xRBS-70 Missiles, 1500x7.62mm |

TriAD

Notes: This is the anti-aircraft gun version of the Swedish CV-90 family. It uses the same hull and autocannon, but the autocannon on the TriAD is capable of being elevated to +50 degrees and is radar-controlled. This version of the CV-9040 does not have the overhead hatches in the passenger compartment. The TriAD also is fitted with an IFF receiver so it does not shoot down friendly targets. The radar is capable of actively tracking six targets simultaneously.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|-------|---------|------|-----|------------------------------------|--------------|
| \$391,560 | D, A | 1 ton | 26 tons | 5 | 11 | Radar, Passive IR, Thermal Imaging | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|---------------------------|
| 109/76 | 25/18 | 525 | 140 | Trtd | T4 | TF14 TS8 TR6 HF18 HS7 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|---------------------------|-----------------------|
| +3 | Good | 40mm L/70 Autocannon, MAG | 234x40mm, 3000x7.62mm |

Atilgan

Notes: This Turkish air defense vehicle is an M-113A2 armored personnel carrier with the fuel tanks moved to the rear and the deck and passenger compartment fitted with a Turkish variation of the Pedestal-Mounted Stinger System (PMSS). The vehicle was exported to other Middle Eastern countries and also used by the Turkish armed forces for mobile SHORAD. Instead of a crewmember sitting inside the turret, the crew is under armor protection inside the hull, with a downlink to the firing system from the PMSS.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|------------|------|-----|--------------|--------------|
| \$224,607 | D, A | 500 kg | 12.25 tons | 3 | 7 | Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------|
| 115/81 | 27/19/3 | 360 | 98 | Trtd | T2 | TF2 TS2 TR2 HF6 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|----------------------------|-------------------------------|
| +3 | Basic | 8xStinger launchers, M-2HB | 16xStinger missiles, 1000x.50 |

M-6 Bradley-Linebacker

Notes: The Linebacker is a standard M-2A2 Bradley with a modified turret and ammunition bins, designed for SHORAD (SHORT-Range Air Defense) duties. The turret's TOW ATGM launcher is replaced with a four-tube Stinger launcher, and internal ammunition bins have been modified to store the longer and thinner Stinger missiles. The Stinger launcher uses one of the launcher boxes of an HMMWV-Avenger SAM system.

Twilight 2000 Notes: By 1998, 60 units of this vehicle had been completed and delivered.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|-------|------------|------|-----|-----------------------------|--------------|
| \$375,002 | D, A | 1 ton | 29.94 tons | 4 | 13 | Passive IR, Thermal Imaging | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------------------|
| 138/97 | 32/23/3 | 662 | 190 | Trtd | T4 | TF11Sp TS11Sp TR6 HF13 HS8Sp HR6 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|---|--|
| +2 | Good | 4xStinger Launchers, 25mm ChainGun, MAG | 10xStinger SAMs, 900x25mm, 2200x7.62mm |

M-42 Duster

Notes: This was one of the first anti-aircraft vehicles produced by the US after World War 2, in the early 1950s. It had been long out of service by US active duty forces by the time of the Twilight War, but could still be found in small numbers in the National Guard. The primary users of the M-42 were foreign countries; in small numbers by Saudi Arabia, Japan, and Turkey, and large numbers in Austria, Greece, Guatemala, Jordan, Lebanon, Thailand, Tunisia, Venezuela, and Vietnam, and especially Taiwan, who used large amounts of them in both anti-aircraft and ground support roles. The vehicle is based on the chassis of the M-41 light tank. Note that the turret does not have any overhead protection, only a gun shield, and the gun crew is not protected by armor in an overhead attack.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|----------|-----------|--------|------------|------|-----|--------------|--------------|
| \$78,310 | G, A | 590 kg | 22.45 tons | 6 | 9 | Headlights | Enclosed |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|---------|----------|-----------|--------|------|-------------------------|
| 167/117 | 39/27 | 530 | 370 | Trtd | T3 | TF3 TS2 TR1 HF6 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|----------------------------------|-----------------------|
| +1 | Basic | 2x40mm Bofors L/60, M-1919A4 (C) | 480x40mm, 1750x.30-06 |

M-48 Chaparral

Notes: This vehicle is a modified M-548 chassis with the rear area taken up by a quadruple mount for Chaparral surface-to-air missiles. The Chaparral is basically a Sidewinder air-to-air missile with a minimum of modifications to suit it for the SAM role. This system has been in use by US Army forces for almost 40 years, using ever-more capable missiles and better target acquisition and fire control equipment. The rear area and cab can be covered by bows and tarpaulin covers, making it virtually indistinguishable from normal M-548 load carriers (a lower priority target); the bows and tarpaulins can be removed in 5 minutes. In addition to the US, the Chaparral is used by Egypt, Israel, Morocco, Taiwan, and Tunisia.

| Vehicle | Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|---------|-----------|-----------|--------|------------|------|-----|--------------|--------------|
| M-48 | \$359,669 | G, A | 500 kg | 11.5 tons | 5 | 7 | FLIR | Open |
| M-48A1 | \$489,709 | D, A | 500 kg | 13.02 tons | 5 | 8 | FLIR | Open |
| M-48A2 | \$369,709 | D, A | 500 kg | 12.89 tons | 5 | 8 | FLIR | Open |

| | | | | | | | | |
|--------|-----------|------|--------|------------|---|---|------|------|
| M-48A3 | \$319,709 | D, A | 500 kg | 12.84 tons | 5 | 8 | FLIR | Open |
|--------|-----------|------|--------|------------|---|---|------|------|

| Vehicle | Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|---------|--------|---------|----------|-----------|--------|------|----------------------------|
| M-48 | 142/99 | 33/23/3 | 401 | 148 | Trtd | T2 | TF1 TS1 TR1 HF1 HS1 HR1 |
| M-48A1 | 129/90 | 30/21/3 | 401 | 75 | Trtd | T2 | TF1 TS1 TR1 HF1 HS1 HR1 |
| M-48A2 | 132/92 | 31/22/3 | 401 | 76 | Trtd | T2 | TF1 TS1 TR1 HF1 HS1 HR1 |
| M-48A3 | 133/93 | 31/22/3 | 401 | 77 | Trtd | T2 | TF1 TS1 TR1 HF1 HS1 HR1 |

| Vehicle | Fire Control | Stabilization | Armament | Ammunition |
|---------------|--------------|---------------|-----------------------|-------------------|
| M-48 | +2 | Basic | 4xChaparral Launchers | 4xChaparral SAMs |
| M-48A1/ A2 | +2 | Basic | 4xChaparral Launchers | 12xChaparral SAMs |
| M-48A3 | +3 | Basic | 4xChaparral Launchers | 12xChaparral SAMs |

M-163A1 PIVAD

Notes: This is an M-113A2 chassis topped by a turret armed with a 20mm Vulcan gatling gun, coupled to ranging radar and, in some later versions, a FLIR viewer. In many countries, the M-163A1 is used as a ground support weapon, being able to saturate an area with large amounts of cannon fire. The hull is similar to the standard M-113, but the commander's station is removed and the large rear deck hatch is replaced with a much smaller one. Besides the US (in decreasing numbers), the M-163A1 is used by Israel, Jordan, Morocco, Portugal, Sudan, Thailand, and Yemen.

Twilight 2000 Notes: This was one of the standard air defense weapons of the US Army at the start of the Twilight War, though it was being rapidly phased out in favor of systems like the Linebacker and Blazer.

| Price | Fuel Type | Load | Veh Wt | Crew | Mnt | Night Vision | Radiological |
|-----------|-----------|--------|------------|------|-----|---------------------------------|--------------|
| \$103,780 | D, A | 400 kg | 12.31 tons | 4 | 7 | Ranging Radar, FLIR, Passive IR | Shielded |

| Tr Mov | Com Mov | Fuel Cap | Fuel Cons | Config | Susp | Armor |
|--------|---------|----------|-----------|--------|------|-------------------------|
| 115/80 | 26/19/3 | 360 | 98 | Trtd | T2 | TF3 TS2 TR2 HF6 HS4 HR4 |

| Fire Control | Stabilization | Armament | Ammunition |
|--------------|---------------|-------------|------------|
| +2 | Basic | 20mm Vulcan | 2280x20mm |