AIR POWER:

GROUND UNIT AND GROUND TARGET DATA

1950 TO 2010

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Introduction

The document describes the properties of ground units and ground targets in the *Air Power* game system, focusing on those relevant for the period from 1950 to 2010.

It builds on the information in the *Air Strike*, *Eagles of the Gulf*, and *The Speed of Heat* games, the *Air Power Journal*, and from Malcolm Pipe's extensive compendium of AAA and SAM units. However, the data have been revised to improve their accuracy and internal consistency, a wider variety of ground combat units are covered, and the descriptions of the units and their weapon systems have been expanded.

Ground Units

A ground *unit* is a combat or logistics formation of infantry, armor, transports, AAA, SAM launchers, or radars. This section discusses them in general.

All ground units have these common properties which together determine their visibility to aircraft, their vulnerability to air-to-ground and ground-to-ground attacks, their capacity for ground-to-ground attacks, their ability to move through difficult terrain, and value in VPs:

– basic type (e.g., infantry or tanks);

– size;

– damage resilience;

– defense strength and target class;

– mobility;

– sighting range in hexes;

– the VPs awarded for 3D/2D/D damage.

Many units also have properties related to their air-defense capabilities.

Size

A ground unit can be a squad, section, platoon, or battery according to its number of soldiers, vehicles, guns, or launchers. Typically:

– A squad has five to ten soldiers and/or one vehicle, gun,

or launcher;

– A section has ten to twenty soldiers and/or two vehicles, guns, or launchers; and

– A platoon or battery has thirty to fifty soldiers and/or three to six vehicles, guns, or launchers.

The term "platoon" is more commonly used for infantry and tank units and "battery" for artillery and air-defense units, but within the game they are equivalent.

Companies, battalions, and other larger units exist above platoons or batteries, but they are represented by multiple units. For example, an infantry company might be formed by three infantry platoons.

Damage Resilience

A ground unit has a numerical damage resilience, which is the amount of damage it can suffer before being killed. It is determined by the size of the unit:

– A squad has a damage resilience of 1D;

– A section has a damage resilience of 2D; and

– A platoon or battery has a damage resilience of 3D.

Defense Strength and Target Class

A ground unit has a numerical defense strength and target class, which are used to calculate the odds of an air-to-ground attack and in ground-to-ground combat.

A ground unit can be a hard, open, or soft target according to the degree to which it provides armored protection to its personnel and weapons:

– A hard target has armored protection both from side and top attacks and is denoted by an underlined defense strength. It is classified as heavy, medium, or light according to its degree of protection, but this classification is simply descriptive. Most tanks, IFVs, and APCs are hard targets.

– An open target has armored protection from side attacks but not from top attacks and is denoted by an underlined defense strength followed by an exclamation point. It is normally treated as a hard target, but against napalm, fire,

FAE, and air-burst HE bombs, it is considered to be a soft target. The BTR-50P APC and the M3 half-tracked APC are examples of open targets.

– A soft target does not have armored protection and does not have an underlined defense strength. Examples include infantry, towed artillery, unarmored vehicles, and armored vehicles that do not fully protect their personnel and weapons such as the M-107 and M-110 tracked artillery vehicles.

Representation

Figures 2, 3, 4, and 5 show the graphical representation of ground units as counters.

The representation is based on NATO symbols, including those for infantry, armor, anti-armor, air defense, guns, missiles, tube artillery, and rocket artillery. One addition is that a rectangle denotes an unarmored vehicle such as a truck or tracked carrier. A truck or mobile unit has two wheel symbols in the lower position, whereas a tracked carrier has a tracked symbol.

All vehicular units have either an armored or unarmored vehicle symbol, all infantry units have an infantry symbol, and towed units have none of these.

The letter T in the central position indicates a transport capacity (e.g., APCs, IFVs, cargo trucks, and tracked cargo carriers). Words and letters in the lower position indicate variants on a basic type: the letters H, M, L, and O on an armored unit indicate heavy, medium, light, and open armored protection; the word WPN or FAC on an infantry unit indicates a weapons or FAC unit; and the letter H on an infantry SAM unit indicates a heavy version of the launcher (e.g., the LML version of Starstreak).

The size of a unit is indicated by one, two, or three dots (for squads, sections, or platoons) or one vertical bar (for batteries) in an upper position.

Mobility

A ground unit has a mobility that may restrict the hexes it may occupy according to the terrain in and around those hexes. Infantry units, armored units (whether tracked and wheeled), and tracked units have unrestricted (U) mobility. Truck and mobile (i.e., truck-borne) units have good (G) or poor (P) mobility. All other units have towed (T) mobility.

A scenario may modify the mobility classes of ground units and the associated restrictions. One common modification is to explicitly indicate the hexes occupied by each ground unit; in this case this rule is largely superfluous.

Basic Rule

A ground unit may occupy hexes as follows:

– A unit with unrestricted mobility may occupy: any urban hex; any clear hex; or any forest hex.
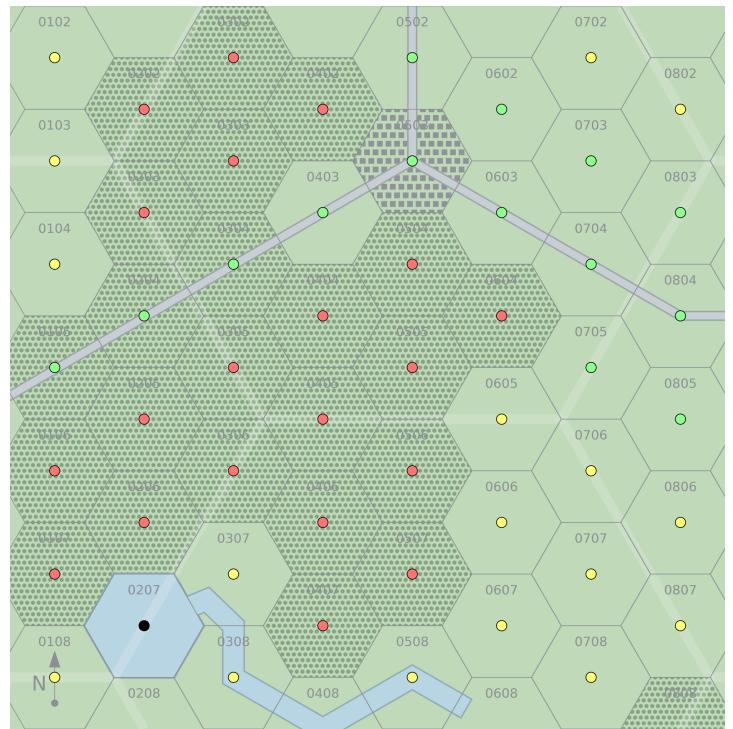

Figure 1: Mobility. A ground unit with poor mobility may only occupy the hexes marked with green dots; one with good mobility may occupy those marked with yellow or green dots; and one with unlimited mobility may occupy those marked with red, yellow, or green dots. No ground unit may occupy the hex marked with a black dot.

– A unit with good, poor, or towed mobility may occupy: any urban hex; any clear hex; or any forest hex with a road or trail.

The basic rules do not distinguish between good, poor, and towed mobility.

Advanced Rule

The following restrictions supersede those in the basic rules:

– A unit with unrestricted mobility may occupy: any urban hex; any clear hex; or any forest hex.

– A unit with good mobility may occupy: any urban hex; any clear hex; or any forest hex with a road or trail.

– A unit with poor mobility may occupy: any urban hex; any clear or forest hex with a road, trail, or runway; or any clear hex adjacent to an urban hex or another clear hex with a road, trail, or runway.

– A unit with towed mobility may occupy hexes according to the mobility of its transport.

Figure 1 illustrates these rules.

When this advanced rule is used, a scenario must specify (or the players must agree) whether truck and mobile units have good or poor mobility, according to the terrain and the capabilities of the trucks represented, and explicitly or implicitly

assign transport units to towed units.

For example, a scenario set in the open desert of southern Iraq might specify that trucks have good mobility, but one set in the Falkland Islands might specify that they have poor mobility. Similarly, a scenario might specify that cargo trucks have poor mobility, but mobile artillery units have good mobility. Finally, a scenario might not assign an explicit transport unit to a towed artillery battery, but might state that it has been transported by helicopter and so can be placed as if it had a transport unit with good mobility.

Transportation

Certain ground units and targets may be *transported* by certain *transport* units.

An infantry or towed unit may be transported by a specific associated IFV, APC, truck, or tracked-carrier unit of at least the same size. Furthermore, the transported unit may be *mounted* or *dismounted*.

A POL or supplies target may be transported by a truck or tracked-carrier platoon as *cargo*. Transported cargo must always be mounted.

A scenario may add further restrictions on transported units or cargos and their transports beyond those in this rule.

Basic Rule

Mounted Units. A mounted unit or mounted cargo is not represented by a separate counter, does not count for stacking, and may not be sighted, identified, or attacked directly. Instead, it is considered to form part of its transport unit. A mounted unit may not attack other ground units or aircraft, may not launch missiles, and may not act as a FAC.

If a transport unit is sighted, no information is given on its mounted unit or cargo.

If a transport unit is identified, any towed mounted unit is also identified (e.g., "the truck platoon is towing artillery" or "the truck platoon is towing a ZPU-4 battery"), otherwise no information is given on its transported unit or cargo.

If a transport unit suffers damage, then its mounted unit or cargo suffers the same damage.

Dismounted Units. At the start of a game, a dismounted unit may be placed according to either its mobility or that of its transport. Otherwise, a dismounted unit and its transport are treated normally. A dismounted unit and its transport need not occupy the same hex.

Advanced Rule

Mounting and Dismounting Infantry. A dismounted infantry unit in the same hex as its specific associated transport may begin to mount by declaring its intention at the start of a Ground Unit Interaction Phase. At the start of the Ground Unit Interaction Phase five game turns later, the unit is considered to be mounted, and its counter is removed from the map.

A mounted infantry unit may begin to dismount by declaring its intention at the start of a Ground Unit Interaction Phase. At the start of the Ground Unit Interaction Phase two game turns later, the unit is considered to be dismounted, and its counter is placed on the map in the same hex as its transport. If placing the counter would violate stacking requirements, the mounted unit must abort the dismounting process.

During these processes, the transported unit may not perform any other action and the transport may not move and may not carry out ground attacks, but may perform barrage fire if it has this capability.

The transported unit may abort the process at the end of any Ground Unit Interaction Phase.

Mounting and Dismounting Towed Units. A towed unit may not mount or dismount during the game.

Composite and Attached Units

Advanced Rule

Composite Platoons. At the start of a game, an infantry, infantry weapons, or infantry HQ platoon may *attach* one or two infantry squads to form a *composite* platoon. The *attached* squads are commonly infantry SAM or FAC squads. A scenario may add further restrictions on forming composite platoons.

A composite platoon has the same damage resilience, defense strength, target class, mobility, and sighting range as its constituent platoon.
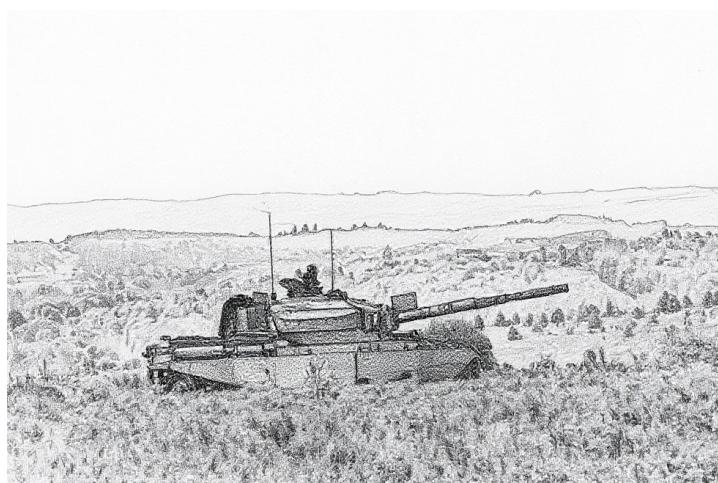
Once formed, a composite platoon may not be split into its constituent units.

Attached Squads. An attached squad is not represented by a separate counter, does not count for stacking, and may not be attacked directly. Instead, it is considered to form part of its composite platoon. An attached squad retains its normal capabilities (i.e., an attached SAM squad may engage aircraft and an attached FAC squad may sight and mark targets).

If a composite platoon is suppressed, each attached squad is suppressed too. If a composite platoon suffers damage, then for each D of damage, roll one die for each attached squad and on a 3– the attached squad is killed. If a composite platoon is killed, each attached squad is killed too. VPs are awarded for damage to any of the constituent units.

Ground Combat Units

Ground combat units represent a combat formations of infantry, tanks, IFVs, APCs, or artillery. Their primary role is combat with other ground units.

Properties

Table 1 summarizes the properties of ground combat units, and Figure 2 shows their representation as counters. The AAA class is B2 for infantry platoons and B3 for AFV platoons, indicating that they are capable of barrage fire to altitudes of 2 and 3 levels, respectively.

Infantry Units

Infantry are soldiers trained to fight on foot. An infantry, infantry weapons, or infantry HQ platoon consists of thirty to fifty soldiers. A mechanized infantry platoon will normally be transported by a platoon of APCs or IFVs. A motorized infantry platoon will normally be transported by a platoon of trucks. An infantry weapons platoon is equipped with machine guns, ATGMs, grenade launchers, or mortars.

An infantry FAC squad has a specialized forward air controller with other soldiers providing communication and protection. Infantry SAM and heavy SAM squads are described in more detail in a subsequent section. Their VP values depend on their type of SAM. An infantry FAC and SAM squad will often be attached to an infantry, infantry weapons, or infantry HQ platoon or transported by a truck squad.

Tank and Anti-Tank Units

A tank is an armored vehicle that is specialized for direct fire with a gun. Tanks are distinguished as having heavy, medium, light, or open armor. An anti-tank vehicle is a lightly armored vehicle equipped with ATGMs. All tank and anti-tank units are platoons. Examples include:

– Heavy Tanks: Ariete, Arjun, Chieftain, Challenger 1/2, Conqueror, IS-3, K1, Leclerc, Leopard 2, M1 Abrams, M-84, Merkava, PT-91, Stridsvagn 103, T-10,

T-64/80/84, T-72/90, Type 90, and Type 96/99.

– Medium Tanks: AMX-30, ASU-85, Centurion, IS-2, ISU-122, ISU-152, Kanonenjagdpanzer, Leopard 1, M4 Sherman, M26 Pershing, M46/47/48 Patton, M103, M60, Panzer 61, Panzer 68, SU-100, T-34, T-54/55, T-62, TAM, Type 59/69/79, Type 61, Type 74, Type 80/88/96, Vickers MBT, and Vijayanta.

– Light Tanks: AMX-10 RC, AMX-13, Ferret, Fox, M24 Chaffee, M41 Walker Bulldog, M551 Sheridan, M1128 Stryker MGS, Panhard AML, Panhard EBR, PT-76, Saladin, Scimitar, and Scorpion.

– Open Tanks: ASU-57 and SU-76.

– Light Anti-Tank Vehicles: AMX-10P HOT, BRDM-2/3 variants, FV438 Swingfire, Jaguar 1/2, M150, M901 ITV, M1134 Stryker ATGM, Raketenjagdpanzer 1/2, Striker, and VAB HOT.

IFV and APC Units

Both IFVs and APCs are armored vehicles that carry infantry. However, an IFV provides fire support and typically has a 20 mm or larger cannon, and an APC does not. All IFV and APC units are platoons. They are further distinguished as having heavy, medium, light, or open protection. Examples include:

– Heavy IFVs: none.

– Medium IFVs: CV90, M2A2 Bradley (only this version), and Marder.

– Light IFVs: all others including the AMX-10P, BMP-1/2/3, LAV-25, M2/3 Bradley (except the M2A2 version), M1296 Dragoon, VCBI, and Warrior.

– Heavy APCs: converted heavy tanks.

– Medium APCs: converted medium tanks.

– Open APCs: BTR-40, BTR-152, BTR-50P, BTR-60P, and M3 half-track.

– Light APCs: Bronco ATTC, BvS10/Viking, BTR-50PK, BTR-60/70/80, FV432, M113, M114, Saracen, Spartan, most Stryker variants, and VAB.

Armored Cars and Half-Tracks

An armored car or an armored half-track is considered to be a light tank, light ant-tank vehicle, light IFV, or a light or open APC according to its role and armament.

Artillery Units

Artillery is specialized in indirect fire. All artillery units are batteries. Artillery may be tube, rocket, or missile and armored, tracked, mobile, or towed. Examples include:

– Armored Artillery: 2S3 Akatsiya, 2S19 Msta-S, Abbot, AMX-30 AuF1, AS-90, M109, and Panzerhaubitze 2000.

– Tracked Artillery: 2S4 Tyulpan, 2S7 Pion, M7 Priest,

    M107, and M110.
- – Mobile Artillery: Archer and CAESAR.
- – Armored Rocket Artillery: M270 MLRS and TOS-1.
- – Mobile Rocket Artillery: BM-21 Grad, BM-30 Smerch, and M142 HIMARS.
- – Tracked Missile Artillery: MGM-52 Lance and Pluton.
- – Mobile Missile Artillery: 9K52 Luna-M (Frog), OTR-21 Tochka (SS-21), and RSD-10 Pioneer (SS-20).

A truck platoon may transport a towed artillery battery.

HQ Units

An armored or infantry HQ platoon represents the HQ unit of a battalion or regiment. There are no IFV, APC, or truck HQ units; the HQ platoon of a mechanized or motorized infantry battalion or regiment will consist of either an armored HQ platoon or an infantry HQ platoon associated with a normal IFV, APC, or truck platoon.
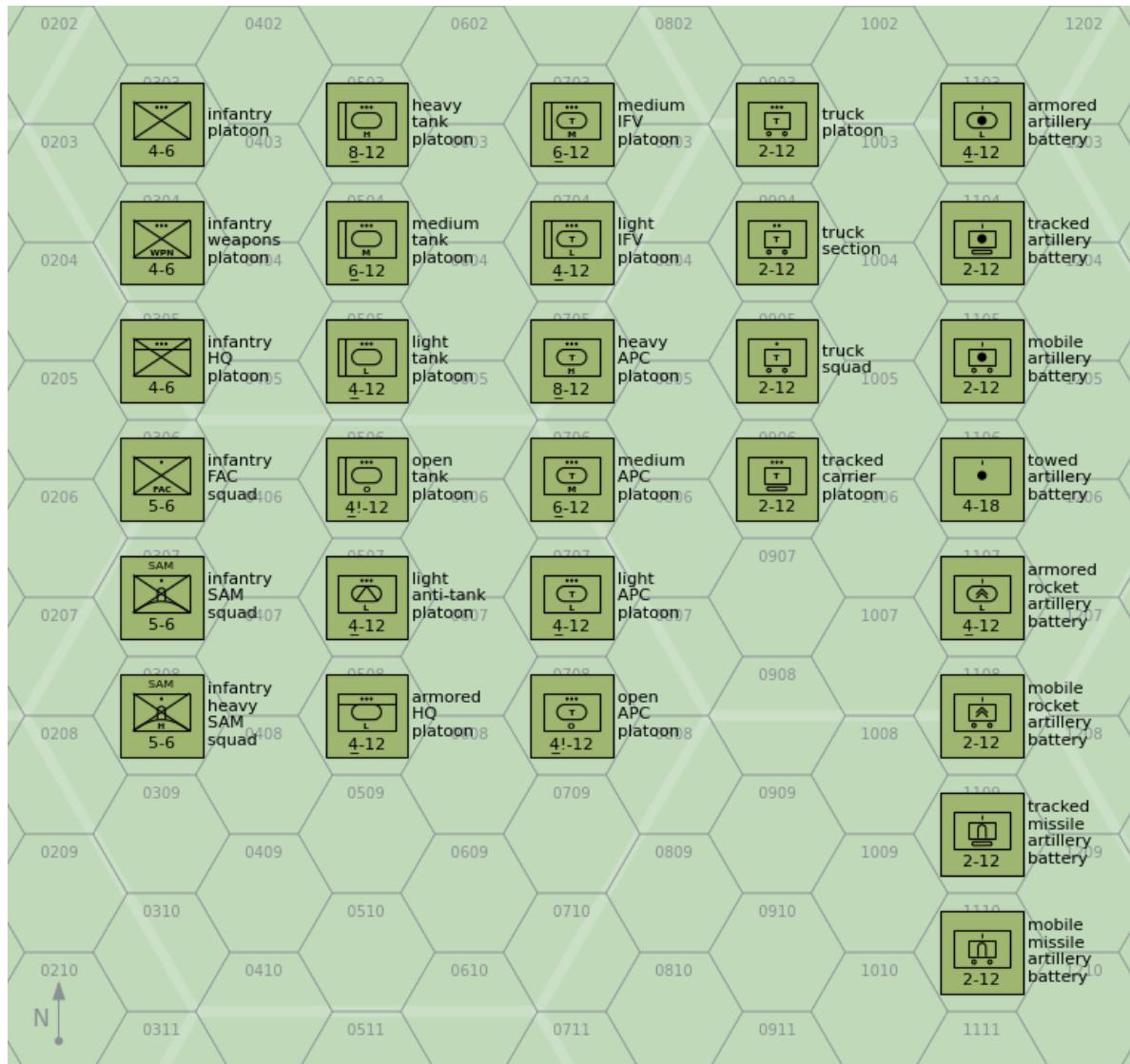
Figure 2: Ground combat and Transport Units

Table 1: Ground Combat and Transport Units

Type	Size	Defense Strength	Sighting Range	Mobility	VPs 3D/2D/D	AAA Class
Infantry	Platoon	4	6	U	5/3/2	B2
Infantry Weapons	Platoon	4	6	U	6/4/2	B2
Infantry HQ	Platoon	4	6	U	10/7/3	B2
Infantry FAC	Squad	5	6	U	−/−/8	—
Infantry SAM	Squad	5	6	U		—
Infantry Heavy SAM	Squad	5	6	U		—
Heavy Tank	Platoon	8̲	12	U	12/8/4	B3
Medium Tank	Platoon	6̲	12	U	10/7/3	B3
Light Tank	Platoon	4̲	12	U	6/4/2	B3
Open Tank	Platoon	4̲!	12	U	5/3/2	B3
Light Anti-Tank	Platoon	4̲	12	U	10/7/3	B3
Armored HQ	Platoon	4̲	12	U	12/8/4	B3
Medium IFV	Platoon	6̲	12	U	10/7/3	B3
Light IFV	Platoon	4̲	12	U	6/4/2	B3
Heavy APC	Platoon	8̲	12	U	10/7/3	B3
Medium APC	Platoon	6̲	12	U	8/5/3	B3
Light APC	Platoon	4̲	12	U	6/4/2	B3
Open APC	Platoon	4̲!	12	U	5/3/2	B3
Truck	Platoon	2	12	G/P	4/3/1	—
Truck	Section	2	12	G/P	−/3/1	—
Truck	Squad	2	12	G/P	−/−/1	—
Tracked Carrier	Platoon	2	12	U	4/3/1	—
Armored Artillery	Battery	4̲	12	U	12/8/4	B3
Tracked Artillery	Battery	2	12	U	10/7/3	—
Mobile Artillery	Battery	2	12	G/P	9/6/3	—
Towed Artillery	Battery	4	18	T	8/5/3	—
Armored Rocket Artillery	Battery	4̲	12	U	12/8/4	B3
Mobile Rocket Artillery	Battery	2	12	G/P	9/6/3	—
Tracked Missile Artillery	Battery	2	12	U	10/7/3	—
Mobile Missile Artillery	Battery	2	12	G/P	9/6/3	—

Transport Units

Transport units provide strategic mobility to combat units and are the life-blood of logistic networks.

Properties

Table 1 summarizes the properties of ground combat units, and Figure 2 shows their representation as counters.

Trucks and Tracked Carrier Units

Trucks and tracked carriers are unarmored or incompletely armored vehicles that transport infantry, towed weapons, and supplies. A truck has good or poor mobility, whereas a tracked carrier has unrestricted mobility.

Trucks include light trucks such as Jeeps, Land Rovers, and Humvees.

Tracked carriers include the M548, Bv 202/206, and BvS10/Beowulf.

AAA Units

AAA units specialize in the use of guns to destroy attacking aircraft, but also have a secondary ground combat capability.

Properties

Table 2 summarizes the properties of AAA units, and Figure 3 shows their representation as counters. As well as the properties common to all ground units, Table 2 gives:

– the AAA class (light, medium, or heavy);
– the maximum altitude;
– the limits of short, medium, and long range in hexes;
– the hit rolls at short, medium, and long range;
– the damage rating;
– whether the unit has an all-weather or ranging-only fire-control radar and its frequency band;
– whether it has night infrared sights; and
– whether it is also equipped with a SAM system.

If the unit has a SAM, this will be described in detail in the section on SAM launcher units.

When comparing these properties, remember that towed batteries have six to eight gun mounts, and armored or mobile sections have only two gun mounts.

FCRs

Some AAA units have integrated FCRs that give them an all-weather and night capability. Most medium and heavy can also use add-on FCRs, described below. Units without an FCR (or with a range-only FCR) are limited to visually sighted targets.

Light AAA Units

M2 Platoon

The Browning M2 .50 cal (12.7 mm) heavy machine gun is normally found on a low tripod for ground combat, but here is used on a tall dual-purpose mount suitable for air defense. A platoon has six guns.

The M2 gun was introduced in 1933 and has been used by United States forces and their allies in numerous conflicts since then.

DShK-38 Platoon

The DShK-38 12.7 mm heavy machine gun is most commonly found on a low, wheeled mount for ground combat, but here is used on a tall tripod suitable for air defense. A platoon has six guns.

The DShK-38 entered service with the Soviet Army in 1938 and saw action in World War II and numerous conflicts since then, including the Korean and Vietnam Wars, in which the Soviet Union participated or provided arms.

M16 Section

The M16 Multiple Gun Motor Carriage has an M45 turret with four M2 .50 cal (12.7 mm) heavy machine guns mounted on a modified M3 half-track. A section has two vehicles.

The M16 was used by United States forces during World War II and (primarily as an anti-personnel weapon) in the Korean War for airfield defense. Additionally, Israeli forces employed it during the 1956 Arab-Israeli War.

M55 Platoon

The M55 has an M45 turret with four M2 .50 cal (12.7 mm) heavy machine guns mounted on a towed carriage. A platoon has four gun mounts.

The M55 was used by United States forces during the Korean War and by Pakistani forces during the 1965 India-Pakistan War.

ZPU-1/2/4 Battery

The ZPU-1/2/4 have single, twin, or quad 14.5 mm heavy machine guns in open mounts on towed carriages. A battery has six gun mounts.

The ZPU-1/2/4 was introduced in 1949 and saw extensive service with Soviet or Soviet-supported forces in many subsequent conflicts, including with communist forces in the Korean War and Vietnam War and with Arab forces in the various Arab-Israeli Wars from 1956 onwards.

Mobile ZPU-1/2/4 Section

This is a section of two light trucks mounting ZPU-1/2/4 guns.

Many users of the ZPU-1/2/4 mount it on a suitable truck for increased mobility. Like the towed versions, it has seen combat in many conflicts.

M167 Platoon

The M167 Vulcan Air Defense System (VADS) has a 20 mm six-barreled Vulcan gun in an open mount on a towed carriage. The fire-control system has optical sights and a range-only radar. A platoon has four gun mounts.

The M167 was introduced into service with the US Army in 1967, principally for airfield defense, and subsequently served with other US allies.

M163 Section

The M163 Vulcan Air Defense System (VADS) has a 20 mm six-barreled Vulcan gun in a lightly armored but open-topped turret on an adapted M113 APC. The fire-control system has optical sights and a range-only radar. A section has two vehicles.

The M163 VADS was introduced into service with the US Army in 1968 and has since been adopted by other US allies. The M163 was used by US forces in the Vietnam War,

the 1989 Invasion of Panama, and the 1991 Gulf War. It was also used by the Israel Army in the 1982 Lebanon War and in 2002 during the Second Intifada.

From 1988 in the US Army, each M163 was typically issued with a FIM-92 Stinger launcher with two rounds, so each M163 section effectively carried a mounted FIM-92 section.

TCM-20 Platoon

The TCM-20 is an Israeli adaptation of the M55, with two Hispano-Suiza 20mm guns from obsolete aircraft replacing the four .50 cal machine guns. As with the M55, the fire-control system is entirely optical. A platoon has four gun mounts.

The TCM-20 was employed by Israeli forces from 1970 and subsequently saw combat in the 1973 Arab-Israeli War and the 1982 Lebanon War.

M3 TCM-20 Section

The M3 TCM-20 has a TCM-20 turret mounted in an adapted M3 half-track, like the earlier M16. A section has two vehicles.

The M3 TCM-20 was used by Israeli forces in the 1973 Arab-Israeli War and the 1982 Lebanon War.

Rh-202 Battery

The Rheinmetall Rh-202 has a single or twin 20mm gun in an open mount on a towed carriage. The fire-control system is entirely optical. The most common version is the twin mount. A battery has six gun mounts.

The twin version entered service with West German forces in 1972 and was used for airfield defense. Subsequently, it was exported and notably used by the Argentine Air Force in the 1982 South Atlantic War in the defense of BAM Malvinas (Port Stanley Airport) and BAM Condor (Goose Green Airfield).

Panhard M3 DCA Section

The Panhard M3 DCA vehicles have an armored turret for twin 20 mm guns mounted on the Panhard M3 APC. The guns have optical sights, but typically one vehicle in each section or platoon is equipped with a search-and-ranging radar and can share this information automatically with the others. A section has two vehicles.

The Panhard M3 DCA served with the armed forces of Côte d'Ivoire, Niger, and the UAE.

ZU-23 Battery

The ZU-23 has twin 23 mm cannons in an open mount on a towed carriage. It was designed as a more powerful replacement for the ZPU-1/2/4. The fire-control system is entirely optical. A battery has six gun mounts.

The ZU-23 was introduced into service by the Soviet Army in 1960. It later served with the armed forces of many Soviet allies, including with North Vietnam in the Vietnam War, with Egypt and Syria in the 1967 and 1973 Wars, with Soviet forces in the Soviet-Afghan War, with Iraq in the Iraq-Iran War, with Syria in the 1982 Lebanon War, and with both sides in the Afghan Civil War.

Mobile ZU-23 Section

This is a section of two light trucks mounting ZU-23 guns.

As with the earlier ZPU-1/2/4, many users of the ZU-23 mount it on vehicles, including trucks, tracked carriers, and APCs, for better mobility.

Sinai 23 Section

The Sinai 23 has a Dassault TA20 turret with two 23 mm guns and six Ayn-al-Saqr (similar to the Strela-2M) or Stinger missiles on an M113 chassis. It has night IR sights. A section has two vehicles. Each battery operates with one vehicle equipped with an RA20S search radar.

The Sinai 23 entered service with the Egyptian Army in 1991.

ZSU-23-4 Section

The ZSU-23-4 has four radar-controlled 23 mm guns, similar to those in the ZU-23, mounted in an armored turret on a hull adapted from the PT-76 light tank. A section has two vehicles.

The ZSU-23-4 entered service in the Soviet Army in 1965, replacing the ZSU-57-2 and outclassing all NATO anti-aircraft guns at that time. A platoon of four was assigned to the air-defense battery of tank and motor-rifle regiments and later complemented by a platoon of four SA-9 vehicles. It was exported to Soviet allies and saw extensive combat with Arab forces in the 1973 Arab-Israeli War and with Iraqi forces in the Iran-Iraq War and the 1991 Gulf War.

LAV-AD Section

The LAV-AD has a 25 mm GAU-12 rotary cannon and eight FIM-92D Stinger missiles mounted in a turret on the LAV-25 vehicle. It does not have radar, but is equipped with a passive night IR sight. A section has two vehicles.

The LAV-AD entered service with the USMC in 1997, but was retired after only a few years.

M53/59 Section

The M53/59 has a twin M53 30 mm gun mount on a partially armored truck. The fire-control system is entirely optical. A section has two vehicles.

The M53/59 entered service in the Czech Army in 1959 and was used instead of the ZSU-57-2. It was also exported to Iraq and saw combat in the Iran-Iraq War and the 1991 Gulf War.

AMX-30SA Section

The AMX-30SA is equipped with a pair of radar-controlled 30 mm Hispano-Suiza guns mounted in an armored turret on the hull of an AMX-30 tank. It is an improved version of the AMX-30 DCA. A section has two vehicles.

The AMX-30SA served only in the Saudi Army from 1979.

Tunguska Section

The Tunguska has twin radar-controlled 30mm guns and four SA-19 missiles in an armored turret on an armored and tracked hull. It was designed to counter the A-10 and AH-64, against which the earlier ZSU-23-4 had weaknesses. A section has two vehicles.

The Tunguska entered service in the Soviet Army in 1984. It has been used by Russia, Ukraine, and Belarus after the break-up of the Soviet Union and has been exported.

Tunguska-M Section

The Tunguska-M is an improved version of the Tunguska with eight missiles instead of four. A section has two vehicles.

The Tunguska-M entered service in the Soviet Army in 1990. It has been used by Russia, Ukraine, and Belarus after the break-up of the Soviet Union and has been exported.

Medium AAA Units

Oerlikon GDF Battery and Section

The Oerlikon GDF has two 35 mm guns in an open mount on a towed carriage. A battery has six gun mounts and a section has two. The basic fire-control system is optical, but a section is often coupled with the Super Fledermaus or Skyguard fire-control radars. (These radars cannot control a whole battery, only a section.)

The Oerlikon GDF entered service in 1963 and has served widely. Notably, it saw combat in the South Atlantic War with the Argentine forces in the defense of BAM Malvinas (Port Stanley Airport) and BAM Condor (Goose Green Airfield).

Gepard Section

The Gepard has two radar-controlled 35 mm guns in an armored turret on an adapted Leopard 1 tank hull. A section has two vehicles.

The Gepard entered service in 1976 with the West German Army and also served with the Belgian and Dutch armies. After the end of the Cold War, they were retired by these armies, and many were sold on to other countries.

61-K Battery

The 61-K (M1939) has a single 37 mm gun in an open mount on a towed carriage. The fire-control system is entirely optical, and the 61-K cannot be coupled to an external fire-control radar. A battery has six gun mounts.

After entering service in 1939 with the Soviet Army, it served in WW2 and after until replaced by the S-60 57 mm gun. It also served with many Soviet allies, and in particular with communist forces in the Korean and Vietnam Wars.

The 61-K is referred to as the "M-38" in *Air Strike, Eagles of the Gulf*, and *The Speed of Heat*.

Bofors L/60 Battery

The Bofors L/60 has a single 40 mm gun in an open mount on a towed carriage. The fire-control system is entirely optical. A battery has six gun mounts.

It entered service in the 1940s and was widely used by Allied forces during WW2, both on land and sea. After the war, many continued to see service, although it was increasingly inadequate against faster jet aircraft and in many cases was replaced by the new L/70 model.

Bofors L/70 Battery

The Bofors L/70 has a single 40 mm gun in an open mount on a towed carriage. Between the 1930s and the end of WW2, aircraft speed increased substantially, and so the engagement time of the Bofors L/60 became inadequate. The new L/70 fired a lighter shell at a higher velocity and achieved a significant improvement in range and engagement time. The basic fire-control system is optical, but various external fire-control radars can be used with it, including the Super Fledermaus and Flycatcher systems. A battery has six gun mounts.

NATO forces and others adopted it widely starting in 1952.

Bofors L/70 BOFI and BOFI-R Battery

The BOFI version of the Bofors L/70 adds modern sights, a laser rangefinder, and proximity-fuzed shells. The BOFI-R version also adds an integrated fire-control radar. A battery has six gun mounts.

The BOFI is used by the armed forces of Brazil.

S-60 Battery

The S-60 is a Soviet single 57 mm gun on an open mount on a towed carriage. The basic fire-control system is optical, but the gun is often used with the SON-9 (Fire Can) radar. A battery has six gun mounts.

It entered service in 1950 with Soviet forces as a replacement for the 61-K 37 mm gun. It was exported to many Soviet allies and saw combat with Arab forces in the 1967 and 1973 Arab-Israeli War, with communist forces in the Vietnam War, and with Iraqi forces in the Iran-Iraq War and the Gulf War. However, it was not used by communist forces in the Korean War. When paired with the SON-9 (Fire Can) radar, it was considered one of the more dangerous AAA systems faced by US aircraft in Vietnam.

ZSU-57-2 Section.

The ZSU-57-2 has two 57 mm cannons in a lightly armored but open-topped turret on an armored and tracked hull. The cannons are similar to the S-60 cannons. The fire-control system is optical. A section has two vehicles.

The ZSU-57-2 entered service in the Soviet Army in 1955 and replaced the BTR-40A and BTR-152A self-propelled 14.5 mm AA guns in the AA batteries of tank regiments. It was in turn replaced by the ZSU-23-4 from 1965. The ZSU-57-2 also served widely with Soviet allies and saw combat with Egypt and Syria in the 1967 and 1973 Wars, with Syria in the 1982 Lebanon War, with North Vietnam in the 1972 Easter Offensive and the 1975 Spring Offensive, and with various factions in the Yugoslav Wars in the 1990s.

Heavy AAA Units

KS-12 Battery

The KS-12 (M1939 52-K) and the very similar KS-12A (M1944 KS-1) have a single 85 mm gun in an open mount on a towed carriage. The fire-control system is optical, but the guns are often paired with the SON-9 (Fire Can) radar. A battery has six gun mounts.

It entered service with Soviet forces in 1939. After WW2, it began to be replaced in Soviet service by the KS-19 100 mm and KS-30 130 mm guns, but was widely used by Soviet allies and saw combat with communist forces in the Korean War and the Vietnam War.

KS-19 Battery

The KS-19 has a single 100 mm gun in an open mount on a towed carriage. The fire-control system is optical, but like other contemporary Soviet guns, it was often paired with the SON-9 (Fire Can) radar. A battery has six gun mounts.

It entered service in 1948 with Soviet forces as a replacement for the KS-12 85 mm gun. It also served with many Soviet allies and saw combat with communist forces in the Korean War and Vietnam War and Iraqi forces in the Iran-Iraq and Gulf Wars.
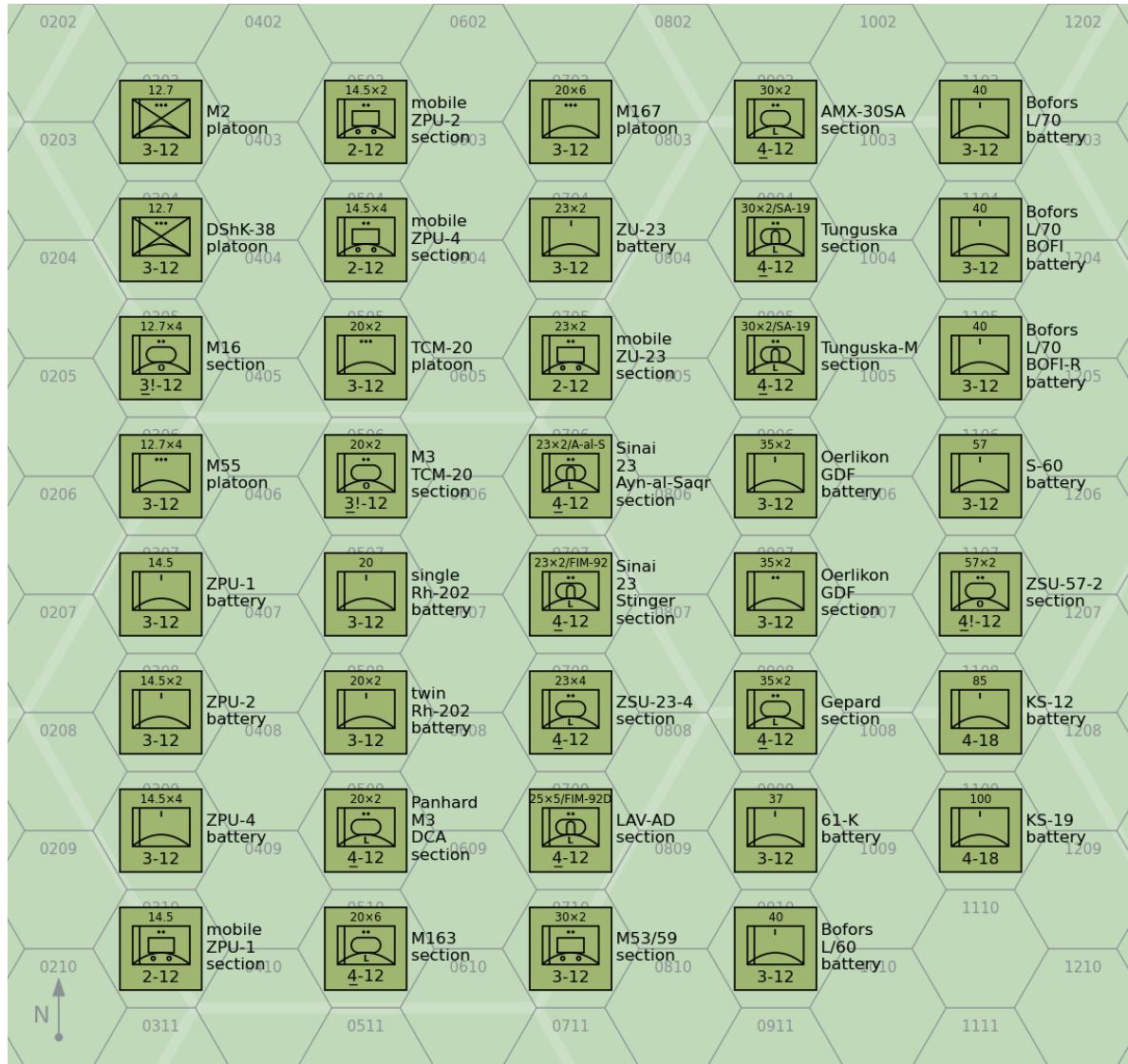
Figure 3: Air-Defense Units: AAA Units

Table 2: Air-Defense Units: AAA Units

Type	Size	Year	Defense Strength	Sighting Range	Mobility	VPs 3D/2D/D	Gun	AAA Class	Altitude	Range S	Range M	Range L	Hit S	Hit M	Hit L	Damage Rating	FCR	Night IR Sights	SAM
M2	Platoon	1933	3	12	U	3/2/1	12.7 mm	L	5	2	3	4	3	2	1	1	—	—	—
DShK-38	Platoon	1938	3	12	U	3/2/1	12.7 mm	L	5	2	3	4	3	2	1	1	—	—	—
M16	Section	1944	3!	12	U	–/6/3	12.7 mm × 4	L	5	2	3	4	4	3	2	2	—	—	—
M55	Platoon	1945	3	12	T	4/3/1	12.7 mm × 4	L	5	2	3	4	5	4	3	2	—	—	—
ZPU-1	Battery	1949	3	12	T	3/2/1	14.5 mm	L	6	2	3	5	3	2	1	1	—	—	—
ZPU-2	Battery	1949	3	12	T	4/3/1	14.5 mm × 2	L	6	2	3	5	4	3	2	1	—	—	—
ZPU-4	Battery	1949	3	12	T	5/3/2	14.5 mm × 4	L	6	2	3	5	5	4	3	2	—	—	—
Mobile ZPU-1	Section	1949	2	12	G/P	–/2/1	14.5 mm	L	6	2	3	5	2	1	0	1	—	—	—
Mobile ZPU-2	Section	1949	2	12	G/P	–/3/2	14.5 mm × 2	L	6	2	3	5	3	2	1	1	—	—	—
Mobile ZPU-4	Section	1949	2	12	G/P	–/4/2	14.5 mm × 4	L	6	2	3	5	4	3	2	2	—	—	—
M167	Platoon	1967	3	12	T	7/5/2	20 mm × 6	L	8	2	4	6	6	5	4	3	R/HF	—	—
M163	Section	1968	4	12	U	–/8/4	20 mm × 6	L	8	2	4	6	5	4	3	3	R/HF	—	—
TCM-20	Platoon	1970	3	12	T	5/3/2	20 mm × 2	L	8	2	4	6	4	4	3	2	—	—	—
M3 TCM-20	Section	1970	3!	12	U	–/6/3	20 mm × 2	L	8	2	4	6	3	3	2	2	—	—	—
Single Rh-202	Battery	1972	3	12	T	4/3/1	20 mm	L	8	2	4	6	4	3	2	2	—	—	—
Twin Rh-202	Battery	1972	3	12	T	5/3/2	20 mm × 2	L	8	2	4	6	5	4	3	3	—	—	—
Panhard M3 DCA	Section	1975	4	12	U	–/7/4	20 mm × 2	L	8	2	4	6	4	4	3	2	R/UF	—	—
ZU-23	Battery	1960	3	12	T	6/4/2	23 mm × 2	L	9	2	5	8	5	4	3	3	—	—	—
Mobile ZU-23	Section	1960	2	12	G/P	–/5/3	23 mm × 2	L	9	2	5	8	4	3	2	3	—	—	—
Sinai 23 Ayn-al-Saqr	Section	1992	4	12	U	–/10/5	23 mm × 2	L	9	2	5	8	4	3	2	3	—	Y	Ayn-al-Saqr
Sinai 23 Stinger	Section	1992	4	12	U	–/12/6	23 mm × 2	L	9	2	5	8	4	3	2	3	—	Y	FIM-92
ZSU-23-4	Section	1965	4	12	U	–/9/5	23 mm × 4	L	9	2	5	8	5	4	3	3	W/VF	—	—
LAV-AD	Section	1997	4	12	U	–/14/7	25 mm × 5	L	10	3	6	9	4	3	2	4	—	Y	FIM-92D
M53/59	Section	1959	3	12	G/P	–/7/4	30 mm × 2	L	11	4	7	9	3	2	1	3	—	—	—
AMX-30SA	Section	1979	4	12	U	–/10/5	30 mm × 2	L	11	4	7	9	5	4	3	3	W/VF	—	—
Tunguska	Section	1984	4	12	U	–/20/10	30 mm × 2	L	11	4	7	9	5	4	3	4	W/VF	—	SA-19
Tunguska-M	Section	1990	4	12	U	–/22/11	30 mm × 2	L	11	4	7	9	5	4	3	4	W/VF	—	SA-19
Oerlikon GDF	Battery	1963	3	12	T	7/5/2	35 mm × 2	M	12	4	8	10	4	3	2	4	—	—	—
Oerlikon GDF	Section	1963	3	12	T	–/5/2	35 mm × 2	M	12	4	8	10	3	2	1	4	—	—	—
Gepard	Section	1976	4	12	U	–/11/6	35 mm × 2	M	12	4	8	10	5	4	3	4	W/VF	—	—
61-K	Battery	1939	3	12	T	5/3/2	37 mm	M	12	4	8	11	3	2	1	4	—	—	—
Bofors L/60	Battery	1935	3	12	T	5/3/2	40 mm	M	15	4	8	12	2	2	1	4	—	—	—
Bofors L/70	Battery	1952	3	12	T	6/4/2	40 mm	M	15	4	8	12	3	3	2	4	—	—	—
Bofors L/70 BOFI	Battery		3	12	T	8/5/3	40 mm	M	15	4	8	12	5	5	4	4	—	—	—
Bofors L/70 BOFI-R	Battery		3	12	T	9/6/3	40 mm	M	15	4	8	12	6	6	5	4	W/VF	—	—
S-60	Battery	1950	3	12	T	8/5/3	57 mm	M	18	5	10	15	2	2	1	5	—	—	—
ZSU-57-2	Section	1955	4!	12	U	–/6/3	57 mm × 2	M	18	5	10	15	2	1	1	5	—	—	—
KS-12	Battery	1939	4	18	T	9/6/3	85 mm	H	27	6	12	18	2	1	0	6	—	—	—
KS-19	Battery	1948	4	18	T	10/7/3	100 mm	H	39	7	14	21	1	1	0	6	—	—	—

FCR Units

Most medium and heavy AAA batteries can be associated with an add-on fire-control radar (FCR), which improves their accuracy and allows them to engage unsighted targets at night and in adverse weather.

Properties

Table 3 summarizes the properties of FCR units, and Figure 4 shows their representation. In addition to the properties common to other ground units, Table 3 gives:

– the FCR class;

– the frequency band; and

– its modifier to the hit roll.

Specific FCRs

SON-9

The Soviet SON-9 (Fire Can) FCR-A was derived from the earlier SON-4, which in turn was derived from the US-supplied SCR-584. It is commonly used with 57 mm S-60, 85 mm KS-12, 100 mm KS-19, and 130 mm KS-30 batteries.

The SON-9 entered service in 1955 with Soviet forces and was widely exported to Soviet allies. It has seen combat, including with North Vietnam in the Vietnam War, Egypt and Syria in the 1967 War, the War of Attrition, and the 1973 War.

Super Fledermaus

The Contraves Super Fledermaus FCR-C can be used to control a section of two Oerlikon GDF 35 mm guns.

It entered service in 1965 with the Swiss Air Force and also was used by the Argentine Air Force, Brazil, Iran, Japan, and South Africa. It saw combat in the 1982 South Atlantic War in the defense of BAM Malvinas (Port Stanley Airport).

Flycatcher

The Signaal Flycatcher FCR-C can control three to six Bofors L/60 or L/70 guns or SAM launchers.
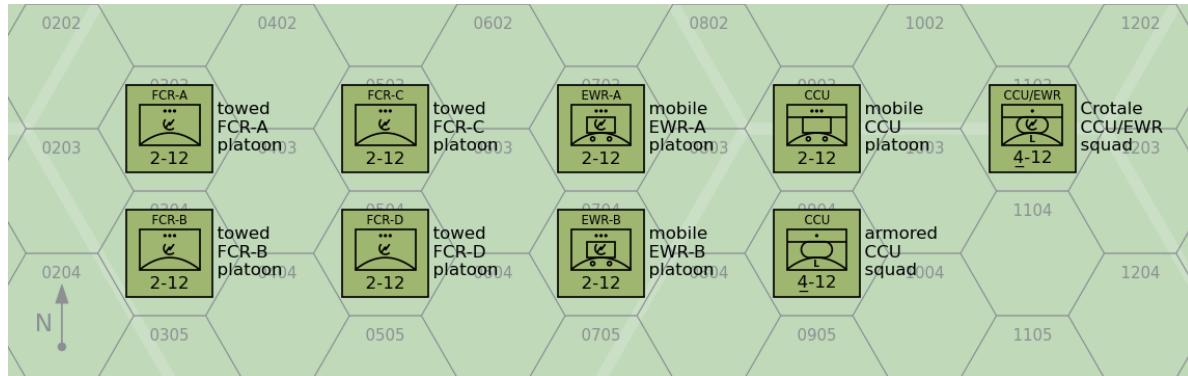
Flycatcher entered service with the Royal Netherlands Air Force in 1979. It subsequently served with the Indian Armed Forces from 1985, the Irish Defense Forces from 2003, the Royal Netherlands Army from 1987,the Thai Armed Forces from 1981, Turkey, and Venezuela.

Skyguard

The Contraves Skyguard FCR-D can control two Oerlikon GDF 35 mm guns and additionally a SAM launcher with AIM-9 Sparrow, RIM-9 Sea Sparrow, or Aspide missiles.

Skyguard entered service in 1977 with the Swiss Air Force. It was subsequently very widely exported and used by the Argentine Army, Austria, Bahrain, Bangladesh, Brazil, Canada, Chile, China, Cyprus, Egypt, Greece, Indonesia, Iran, Italy, South Korea, Kuwait, Malaysia, Oman, Pakistan, Saudi Arabia, Spain, Taiwan, and the UK. It saw combat with the Argentine Army in the 1982 South Atlantic War in the defense of BAM Malvinas (Port Stanley Airport) and BAM Condor (Goose Green Airfield).

Figure 4: Air-Defense Units: FCR, EWR, and CCU Units

Table 3: Air-Defense Units: FCR Units

Type	Size	Defense Strength	Sighting Range	Mobility	VPs 3D/2D/D	Class	FCR Frequency	FCR Modifier
Towed FCR-A	Platoon	2	12	T	6/4/2	A	LF	−1
Towed FCR-B	Platoon	2	12	T	6/4/2	B	MF	−2
Towed FCR-C	Platoon	2	12	T	7/5/2	C	VF	−2
Towed FCR-D	Platoon	2	12	T	8/5/3	D	MW	−3

SAM Units

SAM launcher units are specialized in the destruction of attacking aircraft with surface-to-air missiles.

Properties

Table 4 summarizes the properties of infantry SAM units, and Figure 5 shows their representation as counters. In addition to the properties shared by all ground units, Table 4 gives:

– the number of ready, volley, and reload missiles;

– the multi-target capability;

– whether the unit has quick-reaction capability;

– whether the unit has IFF capability;

– whether the unit has night IR sights; and

– the optical lock-on number and range.

Missile Properties

Table 5 summarizes the properties of the actual missiles:

– guidance mode;

– launch roll;

– turn rate;

– flight time;

– visibility;

– ECCM, chaff, and flare ratings;

– whether the missile is active homing (AH) or has a home-on-jam (HOJ) capability;

– boost phase in FPs;

– base speed and sustainer duration in game turns;

– minimum altitude (and modifier for targets at T level);

– hit rolls for direct and proximity hits; and

– damage ratings for direct and proximity hits.

Infantry SAM Units

Infantry SAM units are squads of infantry specialized in the destruction of attacking aircraft with portable SAMs. Each squad has one launcher and, unless otherwise specified, one ready missile and two reload missiles.

Infantry SAM squads may be attached to infantry, infantry weapons, or infantry HQ platoons.

Most infantry SAMs do not have true proximity fuzes. Thus, proximity hits in the game correspond to glancing direct hits in reality.

SA-7A/B Squad

The 9K32 Strela-2 (SA-7A Grail) was the first Soviet portable SAM. It has a rear-aspect, uncooled IR seeker.

The 9K32M Strela-2M (SA-7B Grail) is similar, but uses a rear-aspect, electrically-cooled IR seeker. In Warsaw Pact armies, the Strela-2M was sometimes used with the PRP portable RWR receiver that was capable of passively identifying enemy aircraft by their radar emissions.

The Strela-2 and -2M entered service with Soviet forces in 1968 and 1970. They have seen combat in almost every conflict since 1970 in which the Soviet Union or its successor states have been participants or supporters. In particular, the Strela-2M was used heavily by North Vietnamese forces in the 1973 Easter Offensive, by Arab forces in the 1973 Yom Kippur War, by Angolan forces in the South African Border War, by the Afghan Mujahedeen in the Soviet-Afghan War (having been supplied by the CIA), by Iran in the Iran-Iraq War in the 1980s, and by Serbian and Serbian-supported forces in the Yugoslav Wars in the 1990s.

SA-14 Squad

The 9K34 Strela-3 (SA-14 Gremlin) is a development of the earlier Strela-2M. It has a rear-aspect, cryogen-cooled IR seeker. In Warsaw Pact armies, the Strela-3 was sometimes used with the PRP portable RWR receiver that was capable of passively identifying enemy aircraft by their radar emissions.

The Strela-3 entered service with the Soviet Army in 1974. It has seen combat in many conflicts since then in which the Soviet Union or its successor states have been participants or supporters. In particular, it was used by Iraqi forces in the 1991 Gulf War.

SA-16/18 Squad

9K310 Igla-1 (SA-16 Gimlet) and 9K38 Igla (SA-18 Grouse) use very similar missiles and launchers, but the Igla-1 has a single-channel IR seeker similar to the SA-14, and the Igla uses a dual-channel IR seeker to reduce its susceptibility to flares. The warhead was similar to the SA-7/14, but also exploded any remaining rocket fuel. In the game, this is simulated by increasing the damage rating by one if the missile attacks before expending more than half of its FPs (round down). Both incorporate IFF interrogators, but these were only used in Warsaw Pact armies.

The Igla-1 entered service with the Soviet Army in 1981 and the Igla in 1983. Both have been widely exported and have seen combat in many conflicts since then in which the Soviet Union or its successor states have been participants or supporters. The Igla was used by Iraqi forces in the 1991 Gulf War, by the Peruvian Army in the 1995 Cenepa War, and by Serbian forces in the 1999 Kosovo War.

FIM-43C Squad

The FIM-43C Redeye Block III was the first US infantry SAM to reach production and enter service. It has a rear-aspect, cryogen-cooled IR seeker.

The FIM-43C entered service with the US Army in 1968 and subsequently was used by Australia, Chad, Denmark, West Germany, Greece, Israel, Jordan, Saudi Arabia, Somalia, Su-

dan, Sweden, and Turkey. It was also supplied by the CIA to the Afghan Mujahedeen and the Nicaraguan Contras.

FIM-92A/B/C/D Squad

The FIM-92A Stinger has an all-angle, second-generation, cryogen-cooled IR seeker. Its warhead weight 3 kg and was significantly more lethal than in earlier missiles. The FIM-92B Stinger POST adds a UV seeker to distinguish flares from aircraft. The FIM-92C/D Stinger RMP have software updates to further improve the performance against flares. All have an IFF interrogator to help avoid fratricide.

The FIM-92A entered service with the US Army in 1981, the FIM-92B in 1986, the FIM-92C in 1989, and the FIM-92D in 1992. They were exported to dozens of US allies including the Afghan Mujahedeen and the Angolan UNITA. They saw service in the 1982 South Atlantic War, the Soviet-Afghan War, the Angolan Civil War, the Libyan Invasion of Chad, the Tajik Civil War, the Chechen War, the Sri Lankan Civil War, the Syrian Civil War, and the Russian Invasion of Ukraine.

Blowpipe Squad

Blowpipe is an MCLOS optically-guided missile. While in theory this gave it an all-aspect capability, in practice guiding the missile to the target in combat proved to be very difficult.

Blowpipe entered service with the British Army and Royal Marines in 1975. It was also used by the Argentine Army, Canadian Army, Chilean Army and Navy, Ecuadorean Army, Guatemalan Army, Portuguese Army, Malawian Army, Malaysian Army, Nigerian Army, Omani Army, Royal Thai Air Force and Army, and the UAE Army. It saw combat in the 1982 South Atlantic War with both sides and had a low success rate. In 1986, it was trialed by the Afghan Mujahedeen, but again was not considered to be effective. Finally, it was also used in the 1995 Cenepa War by Ecuador.

Javelin/Starburst Squad

Given the poor performance of Blowpipe in the 1982 South Atlantic War, Javelin was quickly developed as an upgraded version of Blowpipe with SACLOS guidance in place of MCLOS guidance. Starburst then replaced the radio-link with laser guidance. Javelin is also called "Javelin GL" and Starburst was originally called "Javelin S15".

Javelin replaced Blowpipe in the British Army and Royal Marines in 1984. It was also used by the Botswana Army, the Canadian Army, the Malaysian Army, the Peruvian Army, and the South Korean Army.

Starburst in turn replaced Javelin in the British Army and Royal Marines in 1989. It was also used by the Canadian Army, the Malaysian Army, the Qatari Army, and the Royal Thai Army. Starburst served with the British Army in the 1991 Gulf War, but was not used in combat.

Starstreak Squad

Starstreak is a high-speed laser-guided missile. As the missile approaches the target, it launches three independent explosive darts. The darts have contact fuzes, but not proximity fuzes.

Starstreak replaced Javelin in the British Army and Royal Marines in 2000 and is also used by the South African Army and the Armed Forces of Ukraine. Starstreak served with the British Army in the 2003 Invasion of Iraq, but was not used in combat. It has seen combat in the Russian Invasion of Ukraine.

Starstreak LML Squad

The Starstreak Light Multiple Launcher (LML) has three ready-to-fire Starstreak missiles on a pedestal mount with a single sighting unit. The launcher and its associated equipment are heavy and will normally be transported by a vehicle unit.

Starstreak LML entered service with the British Army and Royal Marines in 2000. It is also used by Indonesia, Malaysia, and South Africa.

Mistral Squad

The Mistral is a French IR-homing missile on a pedestal mount. The missile has a considerably larger warhead than either the Stinger or Igla missiles, but this comes at a cost in portability. The launcher and its associated equipment are heavy and will normally be transported by a vehicle unit.

The Mistral entered service with the French Army in 1990. It was subsequently exported to many other countries.

RBS 70 Squad

The RBS 70 is a Swedish laser-guided missile on a pedestal mount. The launcher and its associated equipment are heavy and will normally be transported by a vehicle unit.

The RBS 70 entered service with the Swedish Army in 1977. It was subsequently used by Argentina, Australia, Bahrain, Brazil, the Czech Republic, Iran, Ireland, Lithuania, Norway, Pakistan, Singapore, Thailand, Tunisia, the UAE, Ukraine, and Venezuela.

Ayn-al-Saqr Squad

The Ayn-al-Saqr ("Eye of the Hawk") missile is a licensed version of the 9M32M Strela-2m (SA-7B Grail) manufactured in Egypt. It equips one version of the Sinai 23 air-defense vehicle.

It entered service with the Egyptian Army in 1984.

Vehicular and Towed SAM Units

Figure 5: Air-Defense Units: Infantry SAM Units

Table 4: Air-Defense Units: Infantry SAM Units

Name	Size	Year	Defense Strength	Sighting Range	Mobility	VPs 3D/2D/D	SAM	Missiles Ready	Missiles Volley	Missiles Reload	Multi-Target	Quick Reaction	IFF	Night IR Sights	Optical	Lock-On Range	Other Names
SA-7A	Squad	1968	5	6	U	–/–/3	SA-7A	1	1	2	—	Y	—	—	7	9	9K32 Strela-2 (Grail)
SA-7B	Squad	1972	5	6	U	–/–/4	SA-7B	1	1	2	—	Y	—	—	7	9	9K32M Strela-2M (Grail)
SA-14	Squad	1974	5	6	U	–/–/6	SA-14	1	1	2	—	Y	—	—	7	12	9K34 Strela-3 (Gremlin)
SA-16	Squad	1981	5	6	U	–/–/8	SA-16	1	1	2	—	Y	Y	—	7	12	9K310 Igla-1 (Gimlet)
SA-18	Squad	1983	5	6	U	–/–/10	SA-18	1	1	2	—	Y	Y	—	8	16	9K38 Igla (Grouse)
FIM-43C	Squad	1968	5	6	U	–/–/4	FIM-43C	1	1	2	—	Y	—	—	7	9	Redeye Block III
FIM-92A	Squad	1981	5	6	U	–/–/9	FIM-92A	1	1	2	—	Y	Y	—	8	12	Stinger
FIM-92B	Squad	1986	5	6	U	–/–/10	FIM-92B	1	1	2	—	Y	Y	—	8	12	Stinger POST
FIM-92C	Squad	1989	5	6	U	–/–/10	FIM-92C	1	1	2	—	Y	Y	—	8	12	Stinger RMP
FIM-92D	Squad	1992	5	6	U	–/–/10	FIM-92D	1	1	2	—	Y	Y	—	8	12	Stinger RMP
Blowpipe	Squad	1975	5	6	U	–/–/6	Blowpipe	1	1	2	—	Y	Y	—	7	9	
Javelin	Squad	1984	5	6	U	–/–/8	Javelin	1	1	2	—	Y	Y	—	7	9	Javelin GL
Starburst	Squad	1989	5	6	U	–/–/8	Starburst	1	1	2	—	Y	Y	—	7	9	Javelin S15
Starstreak	Squad	2000	5	6	U	–/–/12	Starstreak	1	1	2	—	Y	Y	—	7	12	
Starstreak LML	Squad	2000	4	6	U	–/–/14	Starstreak	3	1	0	—	Y	Y	—	7	12	
Mistral	Squad	1990	4	6	U	–/–/11	Mistral	1	1	2	—	Y	—	—	7	12	
RBS 70	Squad	1977	4	6	U	–/–/8	RBS 70	1	1	2	—	Y	Y	—	7	10	
Ayn-al-Saqr	Squad	1984	5	6	U	–/–/4	Ayn-al-Saqr	1	1	2	—	Y	—	—	7	12	

Table 5: SAMs

Name	Year	Guidance Mode	Launch Roll	Turn Rate	Flight Time	Visibility	ECCM	Chaff	Flare	AH	HOJ	Instant Arming	Boost Phase	Base Speed	Sustainer	Minimum Altitude	Hit Direct	Hit Proximity	Damage Direct	Damage Proximity	Other Names
SA-7A	1968	I	6	BT	1	6	—	—	5	—	—	Y	—	10	0	T	5	6	4	2	9M32 Strela-2 (Grail)
SA-7B	1972	I	7	BT	1	6	—	—	5	—	—	Y	—	10	0	T	5	6	4	2	9M32M Strela-2M (Grail)
SA-14	1974	M	7	BT	1	6	—	—	4	—	—	Y	—	9	0	T	6	7	4	2	9M34 Strela-3 (Gremlin)
SA-16	1981	M	8	BT/2	1	6	—	—	4	—	—	Y	—	12	0	T	6	7	4*	2*	9K310 Igla-1 (Gimlet)
SA-18	1983	A	8	BT/2	1	6	—	—	2	—	—	Y	—	12	0	T	7	8	4*	2*	9K38 Igla (Grouse)
FIM-43C	1968	M	7	BT	1	6	—	—	5	—	—	Y	—	10	0	T	6	7	4	2	Redeye Block III
FIM-92A	1981	A	8	BT/2	1	2	—	—	3	—	—	Y	—	14	0	T	7	8	5	3	Stinger
FIM-92B	1986	A	8	BT/2	1	2	—	—	1	—	—	Y	—	14	0	T	7	8	5	3	Stinger POST
FIM-92C	1989	A	8	BT/2	1	2	—	—	1	—	—	Y	—	14	0	T	7	8	5	3	Stinger RMP
FIM-92D	1992	A	8	BT/2	1	2	—	—	1	—	—	Y	—	14	0	T	7	8	5	3	Stinger RMP
Blowpipe	1975	OG	8	HT	1	6	—	3	0	—	—	—	—	8	0	T	3	7	6	5	
Javelin	1984	OG	8	ET	1	5	—	2	0	—	—	Y	—	10	0	T	5	8	6	5	Javelin GL
Starburst	1989	LG	8	ET	1	5	—	1	0	—	—	Y	—	10	0	T	5	8	6	5	Javelin S15
Starstreak	2000	LG	8	ET	1	5	—	1	0	—	—	Y	—	24	0	T	7	9	6	4	
Mistral	1990	A	8	ET	1	5	—	—	2	—	—	Y	—	18	0	T	7	9	6	3	
RBS 70	1977	LG	8	ET	1	6	—	2	0	—	—	—	—	12	0	T	5	8	6	3	
Ayn-al-Saqr	1984	I	7	BT	1	6	—	—	5	—	—	Y	—	10	0	T	5	7	4	3	

EWR and CCU Units

Ground Targets

A ground *target* is a unit of infrastructure such as a bridge and a building.

Properties and Representation

Ground targets are listed with their properties in Table 6.

All ground targets have these properties:

- defense strength;
- defense strength and target class;
- sighting range in hexes; and
- the VPs awarded for 3D/2D/D damage.

All ground targets have a damage resilience of 3D. That is, they are killed when they suffer 3D or more damage.

Some ground targets are represented by counters, and others are represented by features on the maps. Figure 6 shows the graphical representation of the counters, which mainly uses adapted NATO symbols.

Notes on Specific Targets

Aircraft

No VP values are given for transport or fighter airplanes or helicopters, since these can vary significantly with the capacity of the aircraft. A scenario must specify the VP values. As a guideline, they will often be similar to the VP values of the attacking aircraft.

Bridges

Unless otherwise indicated in a scenario, a major bridge is one that extends over two or more hexes, a minor bridge is one that is confined to a single hex, and a small bridge is where a road crosses a river without a bridge being marked on the map.

Penetrating Bombs

When attacking a bunker entrance, a tunnel entrance hex, or a shelter, the attack strength of a penetrating bomb is doubled.
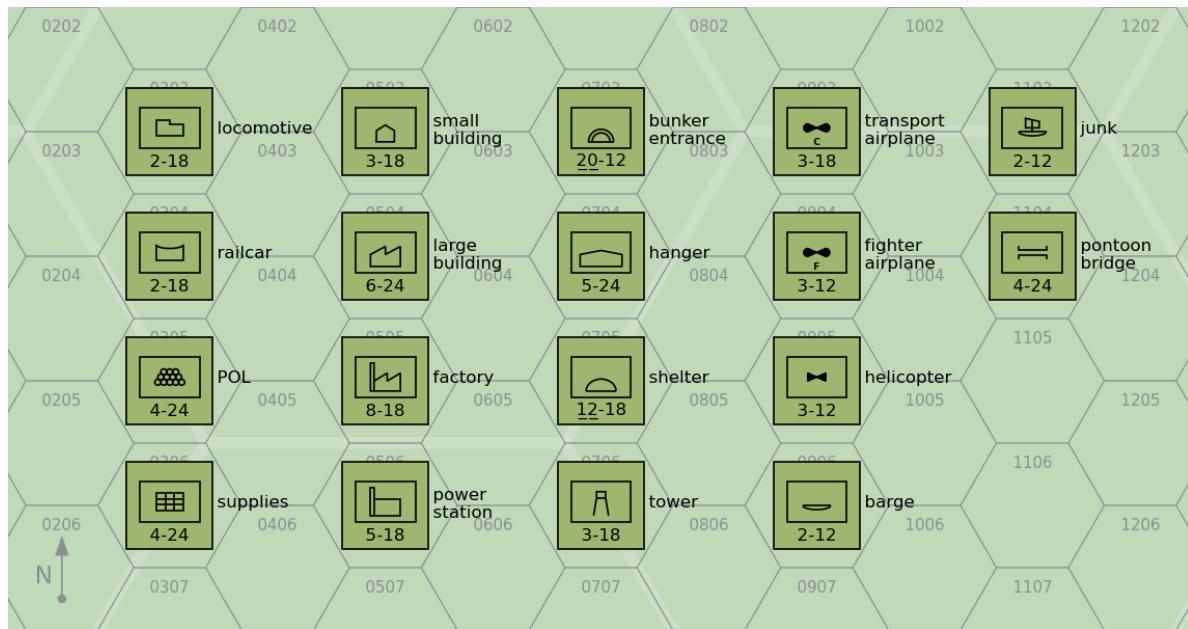
Figure 6: Ground Targets

Table 6: Ground Targets

Type	Counter?	Defense Strength	Sighting Range	VPs 3D/2D/D
Locomotive	Y	2	18	12/8/4
Railcar	Y	2	18	5/3/2
POL	Y	4	24	15/10/5
Supplies	Y	4	24	15/10/5
Small Building	Y	3	18	4/3/1
Large Building	Y	6	24	7/5/2
Factory	Y	8	18	20/13/7
Power Station	Y	5	18	12/8/4
Bunker Entrance	Y	20	12	30/20/10
Barge	Y	2	12	4/3/1
Junk	Y	2	12	4/3/1
Hanger	Y	5	24	8/5/3
Shelter	Y	12	18	12/8/4
Tower	Y	3	18	5/3/2
Transport Airplane	Y	3	18	
Fighter Airplane	Y	3	12	
Helicopter	Y	3	12	
Railroad Hex	N	6	24	5/3/2
Railyard Hex	N	10	24	12/8/4
Docks Hex	N	10	36	8/5/3
Piers Hex	N	10	36	8/5/3
Road Hex	N	8	24	2/1/0
Trail Hex	N	6	12	
Tunnel Entrance Hex	N	12	0	10/7/3
Runway Hex	N	10	36	8/5/3
City Hex	N	5	48	8/5/3
Town Hex	N	3	36	2/1/0
Village Hex	N	3	36	2/1/0
Major Bridge	N	18	48	30/20/10
Minor Bridge	N	12	36	18/12/6
Small Bridge	N	6	24	6/4/2
Pontoon Bridge	Y	4	24	6/4/2
Dam	N	20	24	15/10/5

Example Orders of Battle

This appendix contains a number of example orders of battle and their correspondence in game units.

– Table 7: 2 Para Battalion at the 1982 Battle of Goose Green. At this time, the battalion had attached half a battery of 105 mm Light Guns from Alma Battery of 29 Commando Regiment, RA, a section of Blowpipes from 43rd Air Defence Battery, RA, and a Recce Troop of 59 Independent Commando Squadron, RE.

– Table 8: 12th Infantry Regiment at the 1982 Battle of Goose Green, with attachments from the 25th Infantry Regiment, 4th Airborne Artillery Regiment, 601st Anti-Aircraft Artillery Group.

We see that we need the following additional ground units:

– towed artillery *section*

Table 7: 2 Para at Goose Green

Element	Game Ground Unit	Notes
Battalion HQ	1 × infantry HQ platoon	
A Company	3 × infantry platoon	
B Company	3 × infantry platoon	
C Company	2 × infantry platoon	Patrol Company
D Company	3 × infantry platoon	
Support Company	1 × infantry weapons platoon	Mortars
	1 × infantry weapons platoon	GPMG
	1 × infantry weapons platoon	MILAN
	1 × infantry platoon	Engineers
Alma Battery	1 × towed artillery section	Three 105-mm Light Guns
Blowpipe Section	2 × infantry SAM squad – Blowpipe	
Engineers Troop	1 × infantry platoon	

Table 8: 12IR at Goose Green

Element	Game Ground Unit	Notes
Regimental HQ	1 × infantry HQ platoon	
SAM Section	2 × infantry SAM squad – SA-7B	
A Company 12IR	5 × infantry platoon	
B Company 12IR	3 × infantry platoon	
C Company 25IR	2 × infantry platoon	
	1 × infantry weapons platoon	
C Company 12IR	2 × infantry platoon	
	1 × infantry weapons platoon	
A Battery, 4AAR	1 × towed artillery section	Three 105-mm Pack Howitzers
B Battery, 601 GADA	1 × Oerlikon 35 mm GDF section	Two guns
	1 × towed FCR-D	Skyguard
9th Engineering Company	1 × infantry platoon	
3 Section B Battery 601AAAG	1 × Rh-202 20 mm battery	Six guns
	1 × EWR	Elta
Security Company	1 × infantry platoon	