

# Tor Missile System - SAM



WEAPON	Difficulty	DAM	PEN	Speed	Guidance	Warhead	RNG
Tor	Average+1	C:8 B:20	11c	Mach 2.8	See below	15kg	2000m-12km
Tor-M	Average+2	C:8 B:20	11c	Mach 2.8	See below	15kg	1500m-12km
Tor-M1	Easy	C:8 B:20	11c	Mach 2.8	See below	15kg	1500m-12km
Tor-M2	Easy+1	C:8 B:20	11c	Mach 2.8	See below	15kg	1000m-12km
WEIGHT							
PRICE							
OTHER							

The **Tor Missile System** ([Russian](#): "Top"; [English](#): [torus](#) <sup>[1]</sup>) is a low to medium-altitude, short-range [surface-to-air missile](#) system designed for engaging [airplanes](#), [helicopters](#), [cruise missiles](#), [precision guided munitions](#), [unmanned aerial vehicles](#) and ballistic targets. [GRAU](#) designation of the earliest model is **9K330**, and [NATO reporting names](#) are **SA-15 Gauntlet** and **SA-N-9 Gauntlet**. It is designed to protect targets from attack at all times and in any weather, not only by shooting down attacking aircraft but also by destroying any munitions before they reach their target. It is air-portable and equipped with [NBC](#) (nuclear, biological and chemical) protection.

## Specifications



A 9K332 TELAR with tracking radar covered. Photo by GulfLINK.

Each 9K331 vehicle is a completely autonomous [TELAR](#), although it can be linked into a wider air defense system. It carries a modern, [phased array](#) radar and 8 missiles which are stored vertically, ready to fire. Target tracking range is 24 km (15 miles), engagement range is up to 12 km (7.5 miles) with minimum range varying between 100-2000 m (328-5,621 feet), depending upon version, and effective altitude is 10-6000 m (33-20,000 ft). The 9K331 TELAR uses the same chassis as the [2S6/9M111 "Tunguska"](#) ([Russian](#): Тунгуска – Tunguska is a siberian river, NATO reporting name SA-19 Grisom) integrated air defense system. Reaction time (from target detection to engagement) is stated as a rapid 5-8 seconds. Targets can be acquired and tracked while the TELAR is moving and missiles can be fired without stopping; However, the reaction time is somewhat longer (around 10 seconds rather than 4) whilst in motion. An [auxiliary power unit](#) (APU) is fitted so that the main engine can be shut down while the radar and missile systems continue to operate when stationary, enabling long periods of readiness. The computer control of the Tor system is a giant leap for Soviet\Russian technology. The digital computers allow for a high degree of automation, similar to the US [Patriot missile](#) system. Target threat classification is automatic and the system can be operated with little input

from operators required, if desired. This is one reason for the high degree of accuracy, ability to intercept small, fast and highly maneuverable targets, and the very fast reaction times of the system.

In addition to the self-propelled, tracked vehicle there are also truck-mounted and towed versions of the Tor. The Tor is designed to replace the [9K33 "Osa"](#) (NATO reporting name [SA-8 "Gecko"](#)) system. It features a much greater degree of automation than many SAM systems, especially its predecessors. It has been compared to the [British Rapier missile](#) and [French Crotale missile](#) systems.

## Missiles



SA-N-9 firing from the Kirov class cruiser *Frunze*.

The 9M330 missile is 3.5 m (11.5 ft) long and weighs 167 kg (368 lb). It carries a 15 kg (33 lb) warhead and has a peak speed of around [Mach 2.8](#). The missiles utilize [command guidance](#) and their detonation is via a radar [proximity fuze](#). The missiles can maneuver at up to 30 [Gs](#) and can engage targets flying at up to Mach 2. Missiles are propelled out of the vehicle before the [solid fuel rocket motor](#) fires and the [gas-dynamic](#) maneuvering system turns them toward their target. Missiles can even be fired against surface targets. Each missile is a [sealed round](#), stored in two groups of four.

[Kill probabilities](#) for later versions are quoted as:

- 0.92-0.95 against aircraft
- 0.80-0.96 against helicopters
- 0.60-0.90 against cruise missiles (with an effective range of around 5 km/3 miles)
- 0.70-0.90 against precision munitions ([LGBs](#), [glide bombs](#), etc.)
- 0.90 against [UAVs](#)

## Radar

There are two [radar](#) systems mounted on the TELAR:

- "Dog Ear" E/F-band pulse/doppler [phased-array](#) surveillance radar (maximum detection range 25 km/16 mi) which can detect up to 48 targets and track ten of them, including [IFF](#) functionality.
- "Scrum Half" G/H and later K-band [phased-array](#) engagement radar (maximum tracking range 20 km/12 mi) which can guide two missiles.

There is also a small antenna to communicate with missiles after launch and before they are acquired by the engagement radar. The surveillance radar can be folded down horizontally when travelling, to reduce the height of the vehicle, and the tracking radar can partially rotate away from vertical to reduce its height. There is an optical tracking system to complement the tracking radar and allow engagements in a heavy [ECM](#) environment.

The naval version of this system utilises the following radars:

- **3R95 "Cross Swords"** G-band surveillance radar (maximum detection range 45 km/28 mi)
- **3R95 "Cross Swords"** K-band engagement radar (maximum tracking range 15 km/9 mi).

## Usage

- Typically, a battery of Tor vehicles is accompanied by the mobile [Ranzhir-M](#) ([Russian](#): "Ранжир-М") command center. It allows for efficient allocation of tasks between the individual Tor-1M crews.
- Tor-1M is a low- to medium-range system. For shorter range, the missile-gun systems [Tunguska](#) and [Shilka](#) are used. For longer range, the Buk-M1/M2 ([SA-11 Gadfly](#)) system is used.

## Variants

- 9K330 "Tor" with the 9M330 missile, minimum range 2 km (1.2 mi), introduced in [1986](#)
- 9K331 "Tor-M" with the 9M331 missile, minimum range 1.5 km (0.9 mi), introduced in [1991](#), with greatly improved missile accuracy and the ability to engage two targets simultaneously
- 9K331M "Tor-M1", "Tor-M1T" with the 9M331 missile, minimum range 1.5 km (0.9 mi)
- 9K332 "Tor-M2", "Tor-MTA", "Tor-MTB", "Tor-MTS" with the 9M331 missile and a new surveillance radar, minimum range 1 km (0.6 mi)



SA-N-9 launcher on the Udaloy class destroyer *Admiral Vinogradov*.

**3K95 "Kinzhal"** ([Russian](#): Кинжал – *dagger*) is the naval version of the Tor and has the [NATO reporting name SA-N-9](#). It is installed on [Admiral Kuznetsov class](#) aircraft carriers, [Kirov class](#) multimission cruisers, [Udaloy class](#) anti-submarine destroyers and [Neustrashimy class](#) frigates. It can guide missiles to up to four targets at once. Range of the ship-borne surveillance radar is 45 km (28 miles). 32 (*Neustrashimy*), 64 (*Udaloy*) or 192 (*Kuznetsov*, *Kirov*) are carried in multiple eight-round revolver [VLS](#) arrays. Some sources report that the 3K95 is equipped with a secondary [infrared](#) guidance system.

The naval version of the later Tor-M1 is known as the "**Yozh**" ([Russian](#): Ёж - *hedgehog*). The export version of the Kinzhal is known as "**Klinok**" ([Russian](#): Клинок - *blade*).

**HQ-17** (Hongqi-17) is a [Chinese](#) copy of the 9K331M system, which is replacing the HQ-61.

Russia has delivered an indeterminate amount of Tor-M1 systems (originally built for Greece) to the Islamic Republic of Iran amid protests from the United States.<sup>[2]</sup> It is suspected that at least 29 such systems have been transferred along with service contracts with an approximate value of between \$700,000,000 and \$1,000,000,000 USD.<sup>[3]</sup>

#### Operators

-  [China](#) - 30
-  [Cyprus](#) - 6
-  [Greece](#) - 25
-  [Iran](#) - 29
-  [Myanmar](#) - 48<sup>[4]</sup>
-  [Russia](#) - 120
-  [Ukraine](#) - 100
-  [Venezuela](#) - 12