

Laith-90 Iraqi Medium-Range Artillery Rocket System

WEG Location: <https://staging.odin.tradoc.army.mil/WEG/Asset/5471ba0354b18ffaa704d1fc32bb8f45>

Tiers:



Domain: Land, Artillery, Rocket Artillery Systems, Medium Rocket Systems (Up to 100 km)

Proliferation: Iraq

Origin: Iraq



Notes

The Laith-90 is a variant of the Russian 9K52 Luna-M (NATO: FROG-7), that has a increased missile range of 90km. The 9K52 Luna-M (Russian: Луна; English: moon, NATO reporting name FROG-7) is a Soviet short-range artillery rocket system. It fires unguided and spin-stabilized 9M21 rockets. "FROG" is an acronym for "Free Rocket Over Ground". The 9M21 rockets are mounted on a wheeled 9P113 transporter erector launcher (TEL) based on the ZIL-135 8x8 army truck. The TEL features a large hydraulic crane used for reloading rockets from 9T29 transporters (also ZIL-135 based). The 9M21 has a range up to 70 km and a CEP (circular error probable) between 500 m and 700 m. The road mobile rocket has a 550 kg warhead and is capable of delivering high

explosive, nuclear, or chemical warheads. The FROG-7 was the latest addition to the "Free Rocket Over Ground" family of unguided, spin-stabilized, short-range (battlefield support) artillery rockets. The rocket was of conventional single-stage design, with a cylindrical warhead of the same diameter as the rocket body, giving it a cleaner, more modern appearance than its predecessors. The FROG-7 has a range of 70 km and a 550 kg warhead, and an impact area of approximately 2.8 km long by 1.8 km wide. The FROG-7 was capable of delivering HE, nuclear, or chemical warheads. The FROG-7 gave the Soviet division commander a deep interdiction/penetration nuclear threat. The FROG-7A was first introduced in 1965 as a replacement for earlier FROG variants, some of which had been in service since the mid-1950s. The FROG-1 and -2 were obsolete. The FROG-3, -4, and -5 variants, mounted on a non-amphibious version of the PT-76 light tank chassis, were obsolete in the USSR, but were still found in other Warsaw Pact armies at the end of the Cold War. The FROG-5 was still used as a training rocket, and the FROG-6 was a dummy rocket used for training purposes only. The FROG-7B, introduced in 1968, was essentially the same rocket as the FROG-7A but with a longer warhead section. Missiles of all modifications had the largest body diameter of 544 mm, the length of missiles of modifications 9M21B, F, E was 8960 mm, missiles of modifications 9M21B1 and E1 were 9400 mm. The speed of the rocket was about 1200 m/s. The FROG-7 was replaced by the SS-21 tactical ballistic missile which had greater range (120 km) as well as probable improvements in reaction time, missile reliability, accuracy, and handling characteristics. Since the SS-21 was mounted on a six-wheeled TEL similar to the SA-8/GECKO SAM system, it has improved cross-country capability and was probably amphibious. Like the SA-8, it probably has an air filtration and overpressure system for collective chemical and biological protection. The SS-21 was first deployed in 1976 in the USSR and was reported in GSFG in 1981. The FROG-7 (9K52 Luna), the final version of the FROG family, was an unguided, spin-stabilized, short-range, battlefield support artillery rocket. The range of the FROG-7A rocket was 70 km with a CEP of 500 to 700 meters. It was fitted with either a 450 kg HE, 450 kg nuclear, or 36 kg chemical warheads. The improved FROG-7B carries a cargo warhead for delivering bomblets or mines. In addition to improvements in the rocket which give it greater range, a new transport-launch vehicle using a wheeled chassis has been developed based on the ZIL-135 [BAZ-135] 8x8 truck. This wheeled transporter erector launcher (TEL) carries one rocket and a crane. It incorporates a number of improvements in rocket handling such as the on-board crane. Reload missiles were placed on the TEL by that vehicle's own hydraulically operated crane on the right side of the launcher rail. A very similar vehicle was also used with the FROG-7 system to transport the reserve rockets. The earlier FROG'S used semitrailers towed by ZIL-157V tractor trucks, and needed crane trucks for reloading of the transport-launch vehicles. Preparation for firing can take 15 to 30 minutes depending on the situation. A typical FROG-7 battalion was equipped with two firing batteries each with two TELs and a D-band RMS (END TRAY) long-range meteorological radar. The cruising

range of the transporter-erector-launcher vehicle was 400 km. The FROG-7 TEL vehicle provides no NBC protection for the crew. The single-rail launcher has limited traverse. In 1961, the Luna complex was adopted by the Soviet Army, which included the 2P16 tracked launcher, based on the amphibious tank PT-76, as well as 3P10 and 3P9 missiles with nuclear and high-explosive fragmentation warheads. Even before the Luna complex entered service with the Decree of the Council of Ministers of the USSR of 02.17.1961, work began on the development of its modernized version with an increased firing range. These works culminated in the creation of a virtually new tactical complex, which received the designation 9K52 "Luna-M". For this complex, a 9M21 rocket was created, a new launcher and a transport vehicle on a ZIL-135LM wheeled chassis. The first launch of the 9M21 rocket took place on December 27, 1961, and the 9K52 Luna-M complex was put into serial production and into service entered in 1964. Serial production was carried out at the Barricades factory. The advantage of the 9K52 Luna-M complex over its predecessor was that the control unit had its own hydro-mechanical crane with a lifting capacity of 3 tons (see photo on the side , above) This made it possible to abandon the semi-trailer transport vehicle, which transported two spare missiles and a self-propelled crane for reloading missiles. The 9P113 launcher provided highway speeds of up to 60 km / h, due to the use of the wheelbase, the tremors and overloads of the warhead were significantly reduced (for the Luna complex, the maximum speed was theoretically up to 40 km / h, but already at a speed of 16 18 km / h on dirt roads there were overloads, unacceptable for a nuclear warhead). Both the 9P113 launcher and the 9T29 transport vehicle have very high cross-country ability. They were capable of overcoming steep slopes up to 30 ° and fords up to 1.2 m deep. The 9P113 installation was capable of performing at least 200 9M21 missile launches. To lock the launcher during the launch of the rocket, four swing-out supports with screw jacks were used. PU 9P113 has a hydraulically driven device for setting the guide to the position for launching the rocket, as well as the necessary equipment for prelaunch and launch. There were also communications equipment, navigation and orientation equipment, power supply and life support systems. 9M21 unguided single-stage solid-fuel rocket was designed to destroy manpower, military equipment, firearms and defensive structures located in the tactical depth of enemy defense. The missile was designed in several versions, different warheads: 9M21B with a nuclear warhead 9N32, 9M21F with a high-explosive fragmentation warhead 9N18F, 9M21G with a chemical warhead 9N18G and even 9M21D with a propaganda warhead 9N18A. High-explosive fragmentation warhead 9N18F contained 200 kg of highly active explosive TGA-40/60 and gave at least 15,000 fragments. In 1969, the 9N18K was put into service with a 420 kg fragmentation warhead containing 42 warheads weighing 7.5 kg each and providing for the defeat of manpower over an area of several hectares. Since the 9H32 warheads in nuclear equipment required constant temperature control to ensure a given yield, and there was no internal heating system in the warheads of the Luna-M, the 9P113 launcher and the 9T29 transport vehicle included electric heating cases designed for maintaining the

temperature of nuclear warheads in a given temperature regime. On the cover itself was a temperature sensor, which provided the on and off heating spirals, depending on temperature. The number of thermal covers coincided with the number of missiles transported (for 9P113 - 1, for 9T29 - 3). To ensure the heating of the main engine during long-term parking without starting the marching engines, a gas unit was included in these units.

DDSFWE The 9M21 missile part consists of three engines, a launch, a main cruise and a "crank" [spin stabilization] engine. All solid-fuel engines. Various missile flight ranges were achieved by using brake flaps, as well as by changing the elevation angle at launch trajectories. The starting engine was placed around the nozzle of the main engine. It works while the rocket moves along the guides of the launcher. The ignition of the charge of the starting engine was produced by the gases of the main engine, penetrating through special holes. The charge of the starting engine was made of single-channel cylindrical checkers of gunpowder RSI-60, arranged in a circle in three rows. The main (sustainer) engine provides a given range of missile flight. It works only on the active part of the trajectory, and then the flight takes place by inertia. The charge of the main engine consists of single-channel cylindrical blocks made of NMF-2 nitroglycerin (ballistic) gunpowder. The armored ends of the checkers hold the charge in the combustion process, provides centering of the rocket. The powder charge was divided in length into two parts. Each part was held in the chamber of the rocket engine with its diaphragms, which approximately halves the load at the attachment points. The operation of the solid propellant rocket motor was significantly affected by the initial temperature of the charge, which ultimately affects the magnitude of the engine thrust. This factor can be eliminated by adjustments to the elevation angle of the guide before starting. In addition, the 9M21 rocket provides for the use of replaceable nozzle bushings, the liners of which have different diameters of the critical section. At elevated temperatures, bushings with a large critical section were used; at lower temperatures, vice versa. This factor can be eliminated by adjustments to the elevation angle of the guide before starting. In addition, the 9M21 rocket provides for the use of replaceable nozzle bushings, the liners of which have different diameters of the critical section. At elevated temperatures, bushings with a large critical section were used; at lower temperatures, vice versa. This factor can be eliminated by adjustments to the elevation angle of the guide before starting. In addition, the 9M21 rocket provides for the use of replaceable nozzle bushings, the liners of which have different diameters of the critical section. At elevated temperatures, bushings with a large critical section were used; at lower temperatures, vice versa. The rocket engine was started by applying an electrical impulse through the onboard connector to the squibs, the initiation of which leads to ignition of the igniter from granular smoke powder, which, in turn, ignites the powder charge of the main engine. The rotation engine serves to compensate for the moment arising due to the eccentricity of the thrust vector, and was located in the region of the center of mass of the rocket. The engine nozzles through curved gas ducts were brought to the side surface of the rocket, the thrust vectors of the engine of rotation were directed tangentially to the surface

of the body and create a torque. The crank engine runs on RSI-60 gunpowder, the operating time was ~ 0.4 s, it turns on after the rocket leaves the guides. In the tail part of 9M21 stabilizers were installed to ensure a stable flight of the rocket along the trajectory. When calculating the data for launching a 9M21 rocket, weather conditions were taken into account, namely the direction and average wind speed at altitude. To do this, the starter battery has a meteorological station, which makes several shots vertically up from a ballistic gun. In the direction and distance of the bullets (daytime with a red ribbon, nighttime - glowing) from the point of the shot, the direction and average wind speed were calculated. To prevent the unauthorized use of nuclear weapons, all launchers capable of launching rockets in nuclear equipment were equipped with code-blocking devices. In 9K52TS launchers, which did not involve the use of warheads in nuclear equipment, there were no code blocking devices. PU 9K52TS was not equipped with thermal covers. The 9M21 missiles were also supposed to be equipped with the 9K53 Luna-MB complex. The development of the Luna-MB complex was started by Decree of the Council of Ministers of 02/05/1962. The 9P114 launcher, which was created on the basis of a wheeled vehicle, allowing landing by Mi-6 or Mi-10 helicopters, was used in this complex. Work on the Luna-MB complex reached the stage of testing prototypes. However, quite a few difficulties were encountered, the main one of which was the need for a preliminary topographic and geodetic reference of the launch position, as well as the large "sailing" of the Mi-10 helicopter with the 9P114 launcher on the external sling. As a result, in 1965, work on this complex was discontinued. A significant drawback of the Luna-M complex was the low accuracy of firing, even the use of a nuclear warhead did not provide guaranteed destruction of well-targeted point targets such as a command post, etc. In this regard, according to the Decree of the Council of Ministers of July 20, 1966, the development of the Luna-3 rocket, equipped with a simplified control system, was begun. It was assumed that the circular probable deviation (CVO) of the new missile at a range of 70km would not exceed 500m. However, the flight tests conducted in 1968-1969 gave an even greater circular probable deviation compared to the prototype. The range corrector worked unsatisfactorily and the continuation of work on this OCD was deemed inappropriate. This complex became the most extensively deployed in the Soviet army, the peak of the deployment of combat vehicles of the complex occurred in 1986, when there were about 750 units in the troops. During the Cold War the most prominent short-range nuclear force [SNF] system at the division level was the unguided free-rocket-over-ground (FROG), which in the Soviet Army was deployed in a battalion of four launchers. As of 1987 the Soviets were replacing FROGs with the more accurate, longer range SS-21s in some divisions opposite NATO. About 500 FROG and SS-21 launchers were opposite NATO. Another 215 FROG launchers were opposite China and in the Far East; some 100 were opposite Southwest Asia and eastern Turkey; and about 75 were in strategic reserve. Designed in 1968, a variant of the 9K52TS complex, designed for firing missiles with a high-explosive warhead, was widely exported to both Warsaw Pact and some non-Warsaw Pact nations. Armies of

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approximately 15 countries, including the armed forces of the Warsaw Pact, Cuba, Egypt, Iraq, Kuwait, Libya, the DPRK, and Yemen became its buyers. Laith, an Iraqi improved version of the FROG-7, had a 90 km range. The combat debut of the complex took place during the 1973 Arab-Israeli war. The Luna-M complex was used in a number of regional conflicts, including in Afghanistan, the Iran-Iraq war of 1980-88, and the Gulf War of 1991. The Syrian army began to use 9K52 Luna-M missile, also known under the NATO designation FROG-7, systems against terrorists. These systems, along with 9K72 Elbrus, for a long time formed the basis of the missile power of the Syrian army. The Soviet Union began delivering FROG-7 to its most faithful ally in the Middle East at the very beginning of the 70s. The Syrians quite successfully mastered this weapon.

Variants

9M21B: Nuclear-armed variant, fitted with a 500 kg (1,213-lb) warhead.

9M21G: This variant is fitted with a 390 kg (860-lb) warhead.

Laith-90: Iraqi version with increased range (90 km) and submunition warhead.

System

Alternative Designation: Laith-90

Type: Medium-Range Artillery Rocket System

Family: 9K52

Crew: 4

Launcher Chassis: 9P113 transporter Erector Launcher (TEL) based on the 8 x 8 BAZ-135 missile launcher

Displacement Time: 5

Emplacement Time: 5

Dimensions (9P113 transporter Erector Launcher)

Length, Vehicle: 9.30

Length, with Missile: 10.80

Width: 2.80

Height: 3.50

Weight, Combat: 23,000

Ground Pressure: INA

Automotive (9P113 transporter Erector Launcher)

Engine Name: INA

Engine Type: 2 x V-8 Gasoline Engine

Engine Power: 90

Maximum Range: 400

Speed, Maximum Road: 70-75

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: 30

Vertical Obstacle: 0.70

Trench: 2.60

Fording Depth: 0.60

Main Weapon System

Transporter Erector Launcher (TEL)

Name: 9P113 transporter Erector Launcher (TEL)

Maximum Elevation: INA

Minimum Elevation: INA

Traverse Range: INA

Traverse Left: INA

Traverse Right: INA

Note: The TEL features a large hydraulic crane used for reloading rockets from 9T29 transporters (also ZIL-135 based).

Missile

Trans: 9M21 Rockets

Length: 9.0

Diameter: 0.55

Engine: 1 x large solid-fuel rocket surrounded by a ring of 18 much smaller nozzles

Guidance System: Unguided, spin-stabilized

Radar: RMS-1 End Tray** meteorological in launch unit

Maximum Range: 90

Minimum Range: 12

Time into Action, Pre Surveyed: 15 to 30 min

Time into Action, Reload: 20 min

CEP: 380-400 m

Warhead Types: conventional: 1,212 lb (550 kg) HE chemical: 457 lb (216 kg) of agent nuclear: 200 kT estimated

Fire Control

Name: INA

Computerized FCS: Yes

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Image Sources

Notes: <https://www.flickr.com/photos/wgrabar/3468652962>; <https://commons.wikimedia.org/wiki/File:9P113-5313.JPG>;