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MISSILES AND ROCKETS

SURFACE-TO-AIR

Tetraedr teams to offer T38 Stilet derivative of SA-8 'Gecko'

BY MIROSLAV GYÜRÖSI

The Belarus company Tetraedr has teamed with Ukraine Luch design bureau to offer the T38 Stilet, the most drastic upgrade yet proposed for the Osa (SA-8 'Gecko') self-propelled surface-to-air missile system.

This teams Tetraedr's 9K33-1T Osa-1T upgraded system (which is based on a new MZKT-69222 three-axle wheeled chassis) with a new T382 two-stage missile that replaces the original 9M33M2/3 series missiles. The latter are no longer in production, and existing stocks have a very limited remaining lifetime.

In an earlier programme intended to overcome the missile's dwindling service life, in 2007 Tetraedr offered a missile-modernisation scheme that involved replacing the existing filling of the missile's solid-propellant rocket motor. It now hopes that the availability of new T382 missiles will encourage Osa users who were deterred from investing in a major upgrade of a system whose ageing missiles would limit the operational life of the converted hardware. Stilet is being promoted as having an operational lifetime of 25 years.

Originally, the Luch design team in Kiev considered developing a missile similar in general configuration to that of the 57E6 from the Russian Pantsir system, but the configuration finally adopted is significantly different.

Despite the change of chassis, the T381 combat vehicle of the T38 Stilet system shows its Osa lineage, but eight ready-to-fire rounds in circular container/launchers replace the six-round armament of the original version. Tetraedr: 1331559

The T382 missile will be 3,158 mm long. Its booster stage will be 209.6 mm in diameter, while the missile itself will have a diameter of 108 mm and the launching weight will be 116 kg. Its wings and stabilisers will fold, allowing it to be packed into a cylindrical container/launcher 3,235 mm in length and weighing 151 kg when loaded.

The booster is designed to have a burn time of 1.5 seconds, while the motor of the main section will have a burn time of 20 seconds. The average speed of the missile will be 850 m/s and it is expected to be capable of manoeuvring at up to 25 g. Its rod-fragmentation warhead weighs 18 kg.

Tetraedr will be the system integrator and is already working on system software that will provide new system capabilities and incorporate the guidance algorithms for the new ▶

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This mock-up shows the planned configuration of the Luch T382 two-stage missile. This will replace the older single-stage missile used by the Osa system and offers twice the range and twice the maximum engagement altitude. Tetraedr: 1331561

▶ missiles. Work on the T38 Stilet is still at an early stage but the company hopes to complete development of a prototype within the next two years. An operational Stilet battery will consist of four T381 combat vehicles armed with T382 missiles, with reload rounds being provided by T383 transport and loading vehicles, each able to carry 24 rounds. This basic tactical unit will be supported by a T384 adjustment vehicle, a T385 technical maintenance vehicle, a T386 mobile AKIPS (avtomatizirovannaya kontrolno-ispitatelnaya podvizhnaya stantsiya) automated test and control station and a T387 ground set.

The T381 combat vehicle carries eight missile containers. These are installed in two groups of four – one on each side of the revolving superstructure. The T383 transport and loading vehicle has a crane with a lifting capacity of 850 kg and can load or unload a T381 combat vehicle in five to seven minutes.

In a battery, one of the four T381s will be designated as the lead vehicle. Should it be destroyed or suffer a major failure, the command function will automatically be transferred to another vehicle in the formation.

A maximum of five minutes is needed to prepare the T381 vehicle for action. Its systems can simultaneously prepare two missiles for launch. This process takes 12 seconds, and the missiles can then be fired up to 10 minutes later.

According to Tetraedr, Stilet will have a maximum effective range of 20 km, and will be able to engage targets flying at speeds of up to 900 m/sec and heights ranging from 25 m up to 10,000 m. The maximum range against crossing targets will be 10 km. The single-shot kill probability will be 0.9, says Tetraedr.

The T381 vehicle will carry the missile launchers and associated hardware; the SOT (stantsiya obnaruzheniya tseley) surveillance radar; SST (stantsiya soprovozhdeniya tseley) guidance radar; SVR (stantsiya vizirovaniya raket) two-channel missile tracker; an SPK (stantsiya peredachi komand) two-channel missile uplink station; an OES (optiko-elektronnaya sistema) combined optronic system; an AFKiTR (apparatura funktsionalnovo kontrola i trenirovki boyevovo raschota) functional test and combat crew training system; plus automated workstations for a crew of three.

The ARM-NR (avtomaticseskoye rabocheye mesto nacsalnika raschota) position is for the vehicle commander, the ARM-OP (avtomaticseskoye rabocheye mesto operatora poiska) is for the search operator and the ARM-ON (avtomaticseskoye rabocheye mesto operatora nevedeniya) is for the guidance operator. All are fitted with flat-panel colour displays.

The SOTs is a centimetric radar whose antenna unit is stabilised in the horizontal plane and rotates at a rate of 33 revolutions per minute. The beam moves between three positions in elevation.

The radar has a peak power of 250 kW and its antenna has a beamwidth of 1.3 degrees in azimuth and either 3 degrees in elevation (in the two lower positions) or up to 18 degrees in the upper position. Combined, the three positions give an elevation coverage of 24 degrees. It can track up to 48 targets simultaneously and has ECCM (electronic counter-countermeasures) features intended to cope with passive and asynchronous impulse electronic-warfare techniques.

A fighter-class target flying at an altitude of 5,000 m can be detected at a range of 40 km. This falls to 27 km for a target flying at 50 m. The smallest target that can be tracked is one with a radar cross-section of 0.03 m^2.

The SST guidance radar is centimetric with moving target indication and has a 200 kW peak power and beam width of 1 degree in azimuth and elevation. It covers ±330 degrees in azimuth and from -12 degree up to +78 degree in elevation. Targets can be tracked at up to 28 km. Unspecified ECCM facilities are provided.

The OES combined optronic system incorporates a television channel, thermal channel and laser rangefinder (LRF).

Its TV channel operates in the 380 – 960 nm band (visible light to near infrared) and has a field of view of 9 x 12 degrees in surveillance mode and 4 x 6 degrees for targeting. A MiG-29 class fighter can be detected at ranges of up to 30 km and tracked at up to 20 km. The 3.0 – 5.0 µm thermal channel has two fields of view – 9.1 degree x 6.9 degrees for surveillance and 2.3 degree x 1.7 degrees for targeting. The 1.064 µm LRF has a maximum range of 18 km.

Each missile is tracked from launch to the moment of warhead detonation by the SVR two-channel tracker. This has a maximum range of 24 km and a working sector of ±15 degrees in azimuth and 12-78 degrees in elevation. Maximum range is 24 km.

Guidance is by radio command and there are two guidance modes – KDU and MTT. The SPK two-channel missile uplink has two channels that can be set to two of eight different frequencies. It has a peak power of 140 kW. The system can be transported in an Ilyushin Il-76 cargo aircraft or by rail as a 02-T dimensioned load. ●