

SURFACE-TO-AIR

Tetraedr offers 'Guideline' upgrade

The Minsk-based Belarus company Tetraedr is offering an upgrade scheme for the widely used but now obsolete S-75 (SA-2 'Guideline') air-defence missile system, writes **Miroslav Gyürösi**. Systems of S-75M, S-75M2 and S-75M3 Volga standard can be modernised to the new S-75-2T 'Volga-2T' level. These S-75 systems were known under the designation Volkhov by the nations of the former Soviet Union and the former Warsaw Pact, but were marketed internationally as the Volga.

The objective of the proposed upgrade is to improve the combat performance of the S-75 SAM system through the use of new guidance methods, and the installation of replacement subsystems incorporating modern signal-processing and digital technologies. All new hardware meets the requirements of GOST V 20.39.304-76 standard for Group 1.7 equipment.

The company offers a basic upgrade, plus a series of options which a customer can select. The basic upgrade involves:

- installing a UVK-75-2T digital command generator;
- adding two new guidance modes – KDC and MTP;
- installing an APP-75-2T automated launch subsystem;
- installing an I33-2T firing preparation operator's unit;
- introducing additional range scales in the SRN guidance radar;
- upgrading the radio command transmitter;
- upgrading the K72V (K72B) units;
- upgrading the UHF receive channel in P40V equipment cabinet;
- upgrading the launch control system;
- installing the new functional-control and



Miroslav Gyürösi: 0560697

> Almost half a century after first entering service, the S-75 SAM system is still in service with more than 30 nations. Upgraded ground systems can prolong the life of the weapon.



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> Tetraedr is able to modernise this SRN-75M3 'Fan Song E' radar as part of its S-75-2T upgrade.

operator-training instrumentation; and ● upgrading the tracking power drives.

The Kinematic Dynamic Control (KDC) method of guidance is intended for use against high-velocity, manoeuvring and ballistic targets, while the Modified Method of Three Points (MTP) is intended to deal with

targets protected by high-intensity active jamming. Both techniques were developed by Tetraedr.

Upgrading S-75 Volga systems to the S-75-2T Volga-2T standard can be carried out at the operating unit. There is no need to return the systems to Tetraedr or to the user's own repair facilities.

The upgrade of a single system to the basic standard without any of the optional upgrades takes a maximum of 20 days.

Additional options being offered are:

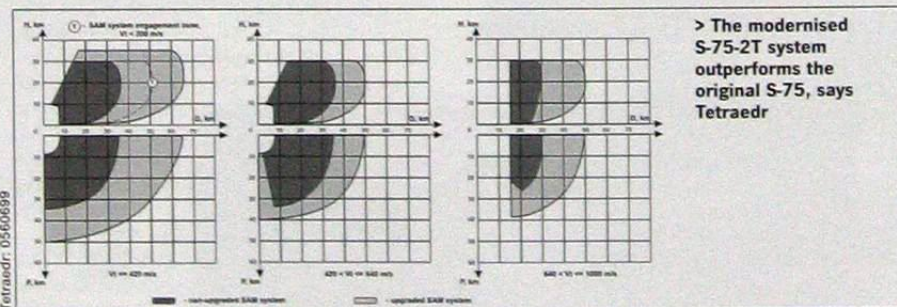
- providing the SNR guidance radar with three target channels;
- upgrading the 9Sh38 optical electronic system;
- providing correlation-and-filtering reception of the target signals;
- upgrading the BAPK (Bistraya Avtomaticheskaya Podstroyka tchastoti Klistrona) klystron fast automatic frequency-control system;
- upgrading the STChK (Stabilizaciya Tchastoti Klistrona) klystron frequency-stabilisation system;
- repackaging the system instrumentation into two cabins;
- reducing the setup time from on-road to combat ready to 20 minutes; and
- repair, refurbishment and life extension of 20D, 5Ya23 missiles (also known as the V-755 and V-759 missiles).

Tetraedr also offers a scheme to repair and renovate the 5V28E missiles used by the S-200 Angara/Vega (SA-5 'Gammon') SAM system. This work can be carried out in the user's country and by local personnel trained by the company.

The process takes place in four stages – preparation, repairing and upgrading the hardware, testing (using the automated AKIPS K43E inspection and test system), and firing tests of selected rounds.

Tetraedr is able to certify the missile's solid-propellant rocket boosters and liquid propellants (TG-02 fuel and AK-27P oxidiser), and has the design skills needed to devise repair schemes, and to document the work.

The life of an upgraded round is extended by up to eight or 10 years.



> The modernised S-75-2T system outperforms the original S-75, says Tetraedr

Basic characteristics	S-75M	S-75-2T
Target channels	1	2 (option for 3)
Missile channels	3	3
Maximum speed of the target	1,000m/sec	1,000m/sec
Minimum target altitude	100m	100m
Maximum target altitude	30km	35km
Maximum effective range*	32-54km	50-65km
Probability of target kill by one missile		
- tactical fighter	0.60 - 0.70	0.80 - 0.85
- manoeuvring target	0.20 - 0.50	0.60 - 0.70

* maximum range depends on target speed



> Tetraedr also can extend the life of the 5V28 missiles used by the S-200 Angara/Vega (SA-5 'Gammon') SAM system.