

## SURFACE-TO-AIR

>> pled device equivalent and substituting a modern liquid crystal display (LCD) in place of the original VPU-55 video display. The upgraded television (TV) sight can detect and track tactical aircraft and helicopter targets at ranges of not less than 25km. An optional laser rangefinder can be incorporated to the TV sight.

A new OES-9A33 electro-optical system includes a 0.36-0.8 $\mu$ m TV system, an 8-14 $\mu$ m thermal night vision system, and a 1.06 $\mu$ m laser range-finder. Information from the OES-9A33 system is displayed on the LCD. The OES-9A33 can be used as the main target acquisition and tracking system, providing range, bearing and elevation data by day or by night. It performs automatic target tracking even in the presence of heavy jamming.

To improve survivability, some parts of the target tracking antenna of the 9A33BM3-IT TELAR is covered by special radar-absorbent coating. This reduces the level of the antenna sidelobes, making the radar harder to detect using electronic surveillance measures or radar-warning receivers.

To warn the crew if their vehicle is about to be attacked with laser-guided weapons, the upgraded TELAR is fitted with laser-warning receivers.

Miroslav Gyürösi: 0549463



> The 9A33BM3 TELAR vehicle is in service with many users worldwide.

Another measure for improved combat survivability is an optional jamming system intended to confuse anti-radiation missiles. This uses small-sized transmitters which operate in the same frequency band as the TELAR's radar – several versions are offered. Transmitters can be located about 12-60m away from the vehicle or released under a small balloon.

Inside the vehicle, the old operator's positions have been replaced by three automated workstations incorporating LCDs. These are for the crew commander, guidance operator, and range operator. A search operator is no longer required since this role is now handled

by the crew commander. The new workstations allow automated fire preparation, automatic functional control of the system, automatic testing and the recording of vehicle combat missions.

The existing system uses the 9M33M2 or 9M33M3 missile, but the upgraded version uses the improved 9M33M3-IT. This has a longer time in flight before self-destructing.

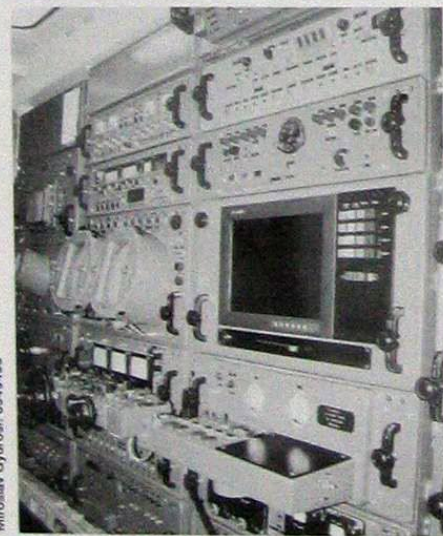
The 9S482M6/M7 (PU-12M6/M7) mobile battery command post has also been upgraded. The existing pattern of workstation is replaced by the new ARM-K based on the specialised VM2407 computer. This operates as a server and provides automatic control of the battery's anti-aircraft operations. The command post communicates with the individual TELAR vehicles via a mobile network using wireless modems. To power the revised TELAR, the Belarus designers replaced the existing GTA-70 gas turbine-powered generator with a more powerful and economical diesel-driven unit.

In the original Osa, training was accomplished using the 9F632 simulator, a unit which was carried in a stand-alone ZIL-131 truck. The simulator of the upgraded system takes the form of a single unit which is fitted to the SL-1M console in the location formerly occupied by the OO04-12M functional test unit.

## Pechora 2-T allows simultaneous radar engagements

Russia's Pechora-2T upgrade of the Almaz S-125 (SA-3 'Goa') medium-range surface-to-air missile system allows the engagement of two targets simultaneously, but only if these lie within the volume of sky covered by the 7°x7° beam of the guidance radar, writes **Miroslav Gyürösi**.

With the unmodified system, the standard method of target engagement is to fire



Miroslav Gyürösi: 0549463

> Equipment consoles within the Pechora 2T radar cabin.



> The UNV fire-control radar seen here is a derivative of the original SNR-125 ('Low Blow') radar. The associated equipment cabin is seen at the right.

Miroslav Gyürösi: 0549464

a two-missile salvo against one aerial target. With the upgraded version, however, the standard technique will be to fire a single missile against each target.

This ability to conduct simultaneous engagements against two targets is made possible by the new UVK-125-2T command generating system. Installed in the radar vehicle in place of the old UK-80 console, it uses two new guidance methods, identified by the Russian acronyms KDU and MTT.

The architecture of the radio frequency system has been revised and the high-frequency receiving subsystem uses solid-state electronics. The jamming resistance of the target channel of the Pechora-2T system is 22 times better than that of the unmodified system, while the sensitivity of the receiver subsystems is improved by a factor of more than two.

To improve mobility and survivability, the entire Pechora 2T system is mounted on wheeled vehicles. In April 2003 it took part in a firing exercise in Kazakhstan.