

VIKING – THE TERROR OF EAGLES AND FALCONS

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It is already an established fact, confirmed in local conflicts of recent years, that a really sound and effective solution against massive air attacks of the enemy is deployment of multi-tire point and field AD, incorporating close-, medium- and long-range ADMSs. One of the major tasks facing the mid-range component is engagement of threats popping up from over the radar horizon at low altitudes in heavy ECM environment. It is also essential that it can engage a wide range of targets, including:

- Tactical and strategic aircraft, regardless of their altitude and types of weapons they deliver,
- Tactical ballistic and cruise missiles,
- Helicopters, including hovering,
- Surface and ground radar contrast targets.

Ranking among the best mid-range ADMSs in the world and the only system produced in quantity in Russia is the Buk series. Its successor, the Viking (9K317ME), is already marketed for export. Designed by the V. Tikhomirov Scientific-Research Institute of Instrument Design (NIIP), the family has been produced at the Ulyanovsk Mechanical Plant. Both enterprises are parented by Almaz-Antey Corporation.

The Buk-M3 (the Viking's export derivative) is a fourth-generation mid-range ADMS, developed by the

Tikhomirov facility. The first-generation platform of the family, dubbed Kub (exported as Kvadrat), was adopted for service in 1967 and supplied to 27 countries. Unlike this family member, the second-generation Buk (1979), Buk-M1 (1983), and Buk-M1-2 (1998) were endowed with a six-target engagement capability. The third-generation Buk-M2 started coming to troops in 2004. Equipped with electronically scanned arrays, it could repel a massive air attack of up to 24 targets. The Buk-M2E enjoys a rather high demand on the international market. Attesting to this is the fact that the system is delivered to countries in South America, the Middle East, and Africa.

Being a successor to the Buk-M2E, the Viking boasts even better performance in terms of multiple-engagement capability, mobility and versatility. It is designed to provide point and field AD against massive attacks of the enemy by his future aerial weapons in heavy fire and ECM environment. The system will equip ADMS brigades in the army/front organizations. The basic unit of the system is a ADMS battalion. The Viking is suitable to provide point and field AD in various types of combat operations, as well as protect administrative and industrial facilities, and the territory of a country.

The system can be deployed on its own or as part of a larger AD group with command and control provided by an automated SAM-brigade control system.

Capable of an all-round operation, the fire channels of the system will cover 120 degrees in azimuth and 85 degrees in elevation.

The Viking is an all-weather system suitable for deployment in various climatic zones at temperature ranging from -50°C to +50°C, and level of humidity of up to 98 percent. The crew compartments are equipped with air conditioners and heaters. The system can be deployed on tracked or wheeled chassis or in trailer mounted modules.

The Viking includes a fire control post, target acquisition radar, up to six SP firing units or illumination and guidance radars or a combination thereof, and up to 12 launchers.

The fire control post provides automated control of the system deployed on a self-sustained mission or as part of a unified AD system controlled by a superior HQ. The post is also suitable for controlling a short-range ADMS battery through a standard battery command post.

The target acquisition radar will detect targets, fix their positions and calculate parameters of their move-



ment, identify them, generate paths, measure angular coordinates of active noise jammers and feed data to the fire control post.

The SP fire unit is a launcher combined with a phased array radar. Both are integrated to provide control over their joint operation via a digital computer. The vehicle will be able to detect a target, lock on it, and engage it within its sector of responsibility on its own or upon receiving targeting data from the fire control post.

The illumination and guidance radar's role is limited to detection, identification, and discrimination of targets (primarily low-level), locking on them and tracking, as well as illumination of the targets and missiles fired at them. Generally, the scope of missions performed by the radar is similar to that of the SP fire unit. However, the former has no launcher, thus it controls operations of two assigned launchers. To extend the range of detection and acquisition of targets, flying low-level and terrain-following missions, as well as provide deployment of the system in forests and mountains, the antenna post of the illumination and guidance radar can be elevated to 21m by a telescoping and rotating platform.

The launcher is designed to carry, store and launch ADMSs upon getting targeting data from the illumination and guidance radar or SP firing unit.

The ADMS is the ultimate means of engagement of aerial threats in conditions of massive air attacks, as well as radar contrast ground and surface targets. Sealed in a transport and launch containers coming in two per package, the ADMS lacks in-flight jettisoned elements. It has a conventional design featuring low-aspect stringer fins. The missile is propelled by a two-mode solid-fuel motor and employs inertial guidance with mid-course radio correction and terminal homing.

The number of the SP fire units and illumination radars is up to the Customer, though it should not exceed six. The number of launchers is calculated rela-

tive to the guidance assets – one launcher per SP unit and two launchers per illumination radar. The Customer will also have to determine the number of SAMs in the system due to the fact that each SP unit and launcher carry six and 12 missiles respectively, as well as the ammunition storage and supply system adopted in the country.

The system comes with maintenance assets, namely group SPTA kits mounted on trailers, tracked and wheeled chassis maintenance shop, loader transporter vehicle, ADMS maintenance vehicle, mobile power sta-

tion, SAM simulators and dummies for training. Training assets are provided at the request of the Customer.

Developed by the V. Tikhomirov Scientific-Research Institute of Instrument Design (NIIP), the system went down as a milestone on the path of development of mid-range ADMS systems in Russia. Attesting to this is the fact that efforts not just resulted in mass production of a fourth-generation multiple-engagement, mobile, and versatile mid-range ADMS platform, but also propelled it to higher performance standards.

Compared to the third-generation ADMS system, the Viking boasts major advantages as follows:

- Increased by a factor of 1.5 have been:
 - Target acquisition and engagement range,
 - Multiple-target engagement capability,
 - Ready-to-fire ammunition load.
- Improved immunity to jamming and survivability, as well as operating properties thanks to, among other things, deployment of missiles in containers.

- Interoperability for firing both new and older ADMSs with the latter launched from the Buk-M2E platform.

These provide simultaneous all-aspect engagement of up to 36 targets flying at 15m to 25km at a maximum range of up to 65km.

In term of major characteristics, the Viking is on par with foreign counterparts, including SAMP/T, MEADS, Patriot, and Spyder-MR. However, these are no match to the Russian system in mobility, firepower, and reaction time.

"Having inherited the best from its predecessors, the new platform is a breakthrough in the development of mid-range AD systems. The designer endowed it with unique properties, meeting modern requirements in protection of troops and installations from modern and future air attack weapons in heavy fire and ECM environment. The Viking remains unsurpassed on the world market," said Deputy Director General Sergey Ladygin of Rosoboronexport in March 2018 and added, "This news is as good as it gets, both for us and our foreign partners."

