



Russia Upgrades Close-Range Air Defense Capabilities

OE Watch Commentary: The accompanying excerpted articles from *Armeyskiy Standart* and *Rossiyskaya Gazeta* discuss the replacement for the Strela-10 (SA-13 Gopher), a close-range surface-to-air missile system with four missiles mounted on a multipurpose tracked light armored (MT-LB) chassis. The *Sosna* (SA-24) close-range surface-to-air missile system can be based upon a MT-LB, BTR, or BMP-3 chassis and consists of 12 *Sosna* 9M337 missiles with a maximum range of 10 km and altitude of 5 km. The system can reportedly detect aircraft at 16-30 km, helicopters at 10-14 km, cruise missiles at 8-12 km, and armored ground targets at 8 km. The *Sosna* is intended for defending supported units from air strikes and cruise missiles, and is capable of operating as part of an integrated air defense system, under the control of various (older, current, and expected) types of mobile command posts. The *Sosna* is one of the last lines of air defense for a supported unit against air threats in the Russian integrated air defense system. Before encountering the *Sosna*, air threats would have to evade the long-range S-300s, S-350s, S-400s, and S-500s of the Aerospace Defense Forces, and the medium-range *Buk-M3s* (SA-17 Grizzly) and short-range *Tor-M2s* (SA-15 Gauntlet) of the Ground Forces. **End OE Watch Commentary (Bartles)**

“The complex can operate in two modes: automatic (without operator involvement) and semiautomatic (the operator controls the system, but many processes are automated). The ‘fire and forget’ principle is used.”

Source: Dmitry Popov, “Авиация противника врежется в «Сосну»: Минобороны берет на вооружение новый зенитный ракетный комплекс (Enemy Aircraft Will Crash Into the Sosna: Defense Ministry Will Take New SAM Complex Into the Inventory),” *Armeyskiy Standart* [Army Standard] Online, 10 July 2019. <https://armystandard.ru/news/t/20196281032-pme9i.html>

Enemy Aircraft Will Crash Into the Sosna: Defense Ministry Will Take New SAM Complex Into the Inventory

They began developing the Sosna in 2005. The main idea was to lighten the design of existing air defense systems of a similar type and introduce an electro-optical control system with laser guidance. By 2013 the Sosna air defense system received a new multichannel automatic all-weather and around-the-clock jam-protected electro-optical weapon control system, the 9M340 Sosna-R precision SAM (the missile control system is teleoriented on a laser beam) and automatic and semiautomatic guidance modes. High effectiveness of the missile also was achieved due to a short flight time to the target, high guidance accuracy, and use of a laser contact-proximity fuze...The complex successfully completed state tests in April 2019.

The most interesting thing in the complex is its combat module. The module design supports all-round weapon guidance -- there are means of acquisition and identification as well as launchers for missiles on a flat rotating platform. In the front part of the combat module is a light armored housing necessary for protecting the electro-optical equipment unit. Two Surface-To-Air Missile (SAM) launchers standing at the sides of the rotating platform are equipped with drives responsible for displacement in the vertical plane, which is necessary for preliminary guidance.

Radar acquisition equipment in the Sosna air defense system was rejected -- air situation monitoring is done only using electro-optical systems. The electro-optical equipment unit includes a daylight camera and thermal imager. The separate thermal imaging device is for tracking a flying missile. Three laser devices are mounted on the unit: two are used as rangefinders and the third as a missile control system. Data from the electro-optical systems are input to the screen of the operator panel and the operator can find the targets and pick them up for tracking.

The complex can operate in two modes: automatic (without operator involvement) and semiautomatic (the operator controls the system, but many processes are automated). The “fire and forget” principle is used. The operator is responsible for the missile launch, but subsequent processes are carried out automatically without human involvement...

In addition, the Sosna air defense system has hardly any emission during the search for and tracking of a target, which means it is more difficult to detect...In addition, the complex also is capable of destroying lightly armored ground equipment.

Source: Anton Valagin, “Новейший зенитный комплекс “Сосна” показали на видео (Latest Sosna Air Defense Complex Shown on Video),” *Rossiyskaya Gazeta* Online, 17 June 2019. <https://rg.ru/2019/06/17/novejshij-zenitnyj-kompleks-sosna-pokazali-na-video.html>

Latest Sosna Air Defense Complex Shown on Video

...A special feature of the air defense missile complex is its standardization. The combat module with the missiles and the guidance system is mounted on the standard turret ring base of an infantry fighting vehicle (BMP), armored personnel carrier (BTR), multipurpose light armored vehicle (MT-LB), or ship or fixed mount. The BMP-3 is the preferred platform. The fast armored vehicle with variable clearance allows the Sosna to easily follow combat formations of armored vehicles, covering them from the air.

But the main advantage of the new air defense system is its missile, the highly accurate 9M340 with a three-channel (laser, television and thermal) guidance system. The automated guidance system provides the Sosna with all-weather, around-the-clock capabilities. Neither heat nor interference (atmospheric or electronic) will keep the 42-kilogram missile from striking its target. The rapidly operating guidance system and the flight speed of the missile are such that the Sosna can effectively strike fast-moving helicopters and drones.

Tests have demonstrated the high effectiveness of the complex in combating various targets. The advantages of the Sosna also include: the capability to fire on the move, excellent survivability, and the low cost of both the entire complex as well as its munitions. In April 2019 the air defense missile system successfully passed state testing...