

# The SAM factory: Russian air-defence capabilities

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**Russia is developing and acquiring several new ground-based air-defence systems and has deployed some of them abroad, such as the S-400 system in Syria. Oscar Widlund charts the latest deployments of Russian ground-based air-defence systems and assesses their overall capabilities**

Ground-based air-defence (GBAD) capabilities in Russia are split between the Russian Ground Forces and the Russian Aerospace Forces (VKS). The army is mainly responsible for operating low-to medium-range air-defence systems, although also has some older long-range S-300 surface-to-air missile (SAM) systems. The majority of Russia's higher-tier GBAD systems, meanwhile, are operated by the VKS, which includes the air- and missile defence troops branch. The VKS was formed after a merger between the Russian Air Force (VVS) and the Russian Aerospace Defence Forces (VKO) in 2015, with the Russian Ministry of Defence (MoD) announcing on 3 August that year that it had activated a new branch of its military. The VKO itself was officially launched on 1 December 2011, which brought together Russia's air- and missile-defence systems along with its missile early warning and space control and monitoring systems under a unified and integrated command-and-control structure.



*A Pantsyr-S1 at Humaymim airbase in a still from a documentary aired by Russia's Zvezda TV. (Zvezda TV)*

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## **Tactical battlefield GBAD systems**

At the lower end of the air-defence spectrum Russia has numerous manportable air-defence systems (MANPADS) in service, including the 9K36 Strela-3 (SA-14 'Gremlin'), 9K310 Igla-1 (SA-16 'Gimlet'), 9K38 Igla (SA-18 'Grouse'), and 9K338 Igla-S (SA-24 'Grinch') systems. Although some

of these systems are ageing, their continued operational usefulness has been demonstrated by their combat performance in Ukraine and Syria.

Meanwhile, according to the MoD, Russian airborne brigades began taking delivery of the 9K333 Verba (Willow) in June 2014. The Verba completed state trials in 2011 and was ordered into production that same year. The system, officially unveiled by Russia's Konstruktorskoye Byuro Mashinostroyeniya (KBM) during Russia's Army-2015 international forum, will replace the earlier Igla-1 and Igla MANPADS. According to KBM Designer General Valeriy Mikhaylovics Kashin, the Verba system significantly improves upon the accuracy and performance of the earlier Igla-S, primarily by integrating a new multispectral optical seeker that covers three wavebands – ultraviolet, near-infrared, and mid-infrared – instead of the dual-waveband infrared used in the Igla-S. The multispectral sensor enables faster discrimination between appropriate targets and decoys and decreases the chance of disruption from infrared countermeasures.

Additionally, Russia has several types of self-propelled anti-aircraft gun and missile (SPAAGM) system. For example, the Russian Ground Forces operate the Tunguska-M/M1 SPAAGM (SA-19 'Grison') system to support Russian armoured formations and to provide air-defence cover for installations. The Tunguska-M1 was reported to be operational with Russian forces in March 2004 after entering service in September 2003 and is an improved version of the 9K22M Tunguska-M, which became operational in 1990. The Tunguska-M1 is armed with the improved 9M311-1M SAM that has a range of 2.5–10 km and a twin 30 mm cannon that has a range of 200–4,000 m, while the older Tunguska-M used the 9M311 missile with a range of 8 km. The Tunguska-M1 also has an improved automatic target engagement mode that reduces the system's reaction time to an airborne threat when engaged and has an improved onboard stabilisation system, radar processor, and fire-control system. Meanwhile, the army also still operates several older ZSU-23-4 Shilka SPAAGs, although these have largely been phased out in favour of the Tunguska.

The VKS also operates the Pantsyr-S1 and upgraded Pantsyr-S2 (SA-22 'Greyhound') SPAAGM to protect important assets. The Pantsyr-S1 consists of two 2A38M 30 mm cannons, 12 57E6 radio-command-guided SAMs, an electro-optic sensor, and a fire-control radar, which are all mounted on a wheeled chassis. According to the commander of the VVS's air-defence forces, Lieutenant General Viktor Gumenniy, the VVS began accepting the S2 version, which has a new radar to increase its combat capabilities, into service in 2015.

Operationally, Russia has deployed Pantsyr systems at Humaymim airbase in Syria to provide close-in defence for the long-range S-400 air-defence system that has also been deployed there. At least one Panytsyr-S1 has been deployed since October 2015 and in February 2016 the RT news channel showed footage of a second system with a new bidirectional radar deployed at the base that it identified as a Pantsyr-S2. This appeared to be the first time that the new Pantsyr had been seen in Russian service. Meanwhile, according to information displayed during Russia's Army-2017 exhibition, the Russian Pantsyr-S1 air-defence systems deployed to Syria had shot down three Israel Aerospace Industries (IAI) Heron unmanned aerial vehicles (UAVs) since the beginning of that year. Later, on 10 January this year, the Russian MoD said in a statement that on the night of 5–6 January the country's bases in Syria had been subject to the first mass attack by UAVs. It said 10 small UAVs were detected by air defences at Humaymim airbase and another three at Tartus naval station, of which seven were destroyed by Pantsyr-S systems while the other six were intercepted by electronic warfare units.

As previously reported by *Jane's*, Russia has also displayed a version of the Pantsyr-S1 integrated onto a Vityaz DT-30-series all-terrain tracked carrier optimised for Arctic operations. This was first

seen in footage of a rehearsal for the country's 9 May Victory Day parade shown by Russian television on 5 April 2017 and later in a photograph released by the MoD on 8 April. A source in the Russian defence industry told *Jane's* at the time that firing trials of the new Arctic Pantsyr-SA were to begin in June 2017. The energy supply system and auxiliary equipment of this variant are integrated into the front unit of the vehicle, while the Pantsyr-SA combat module is mounted on the rear. The armament suite differs from the basic Pantsyr-S in that the original system's two side-mounted 2A38 anti-aircraft cannons have been replaced by three additional containerised SAMs on each side of the target tracking radar, meaning the ready-to-launch ammunition load for this system has increased from 12 to 18.

Meanwhile, in October 2016 Vladimir Popov, director general of Shcheglovsky Val Company (a subsidiary of the High-Precision Systems Corporation), said Russia would begin production of a new version of the Pantsyr, the Pantsyr-SM, in about 2018.

**[Continued in full version...]**

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