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S-350E «Vityaz» (50R6)

S-350 «Vityaz» employs the element of the Russian air defence CONOPS which calls for dealing with saturation attacks via use of the mixture of missiles of different types. In order not to waste the potent (and expensive) longer-range 9M96-2 missiles S-350 employs the shorter-range (up to 40 to 60 km) 9M96 as the short-range (6 to 10 km) 9M100 SAM to deal with targets which cannot be intercepted on the longer distance (like PGM).

9M96-2 SAM provide S-350 the capability to engage and intercept tactical ballistic missiles (range up to 600 km) on the distance up to 30 km (altitude up to 30 km).

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S-350E «Vityaz» (50R6)

9M96-2

9M96

9M100

The same concept of dealing with saturation attacks is currently being applied to SA-21/S-400 SAM systems in the Russian possession – while there are no the fundamental technical obstacles which would prevent its employment in the export SA-20/S-300PMU-2 systems too. The Russian S-400 system currently uses the mixture of the 48N6-2/48N6-3 long-range and the 9M96-2 SAM. All three types of SAM have the capability to engage ballistic missiles.

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S-400 / SA-21

The Ground Troops Air Defence SA-17/«Buk-M2» system also has the limited TBMD capability (range up to 20-25 km, altitude up to 16-18 km against ballistic target) – while the capability of each SA-17 launcher/tracking/illuminating vehicle to engage 4 aerodynamic targets simultaneously on the distance of up to 52 km is probably the more important feature.

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«Buk-M2» (9K317) / SA-17

SA-15/«Tor-M2» is also the multi-channel of fire system with the capability to engage 4 targets simultaneously. SA-15 might be tailored to the customer's needs being marketed in either mobile (tracked or wheeled vehicle) or containerised variants with the latter having the option to be installed on trailer to provide the limited mobility.

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«Tor-M2» / SA-15

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«Tor-M2KM» / SA-15

Another important Russian air defence operational concept is the closing the gaps in air defences immediately *over* SAM systems. The dome AESA is employed for this purpose by the 42S6 «Morpheus» short-range (up to 5-10 km range) SAM system undergoing the final stage of development in Russia now. (There is no NATO designator for 42S6 yet.) The system is already proposed for export.

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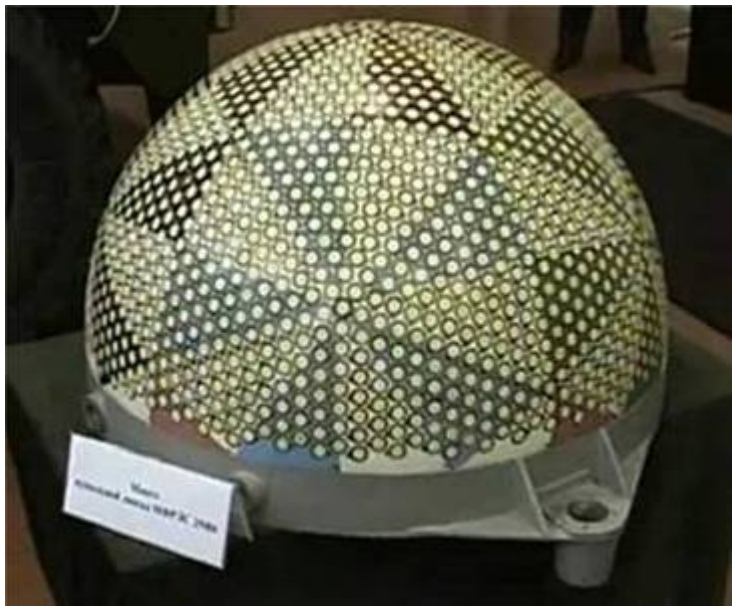
42S6 «Morfey» («Morpheus»)



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The current Russian Air defence CONOPS calls for the wide use of passive AD systems – either the comparatively longer-range (up to 12 km) «Bagul'nik» («Sosna» in the export version) with the laser-guided SAM and the sector optronic acquisition/tracking station…

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«Sosna» («Bagul'nik» in the Russian service)

…or the shorter-range (up to 5.2 to 6.5 km) while all-passive SAM system based upon MANPAD missiles with and the more capable 360-degrees «Feniks» («Phoenix») acquisition/tracking optronic station.

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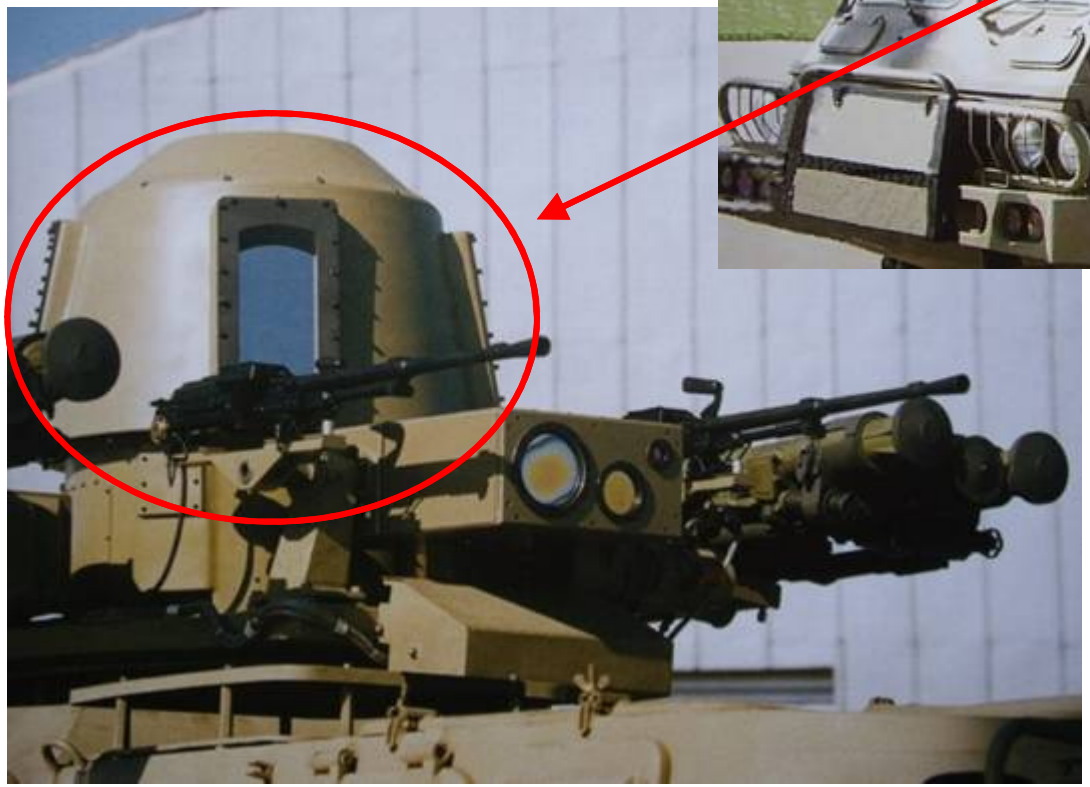
ZRK BD-PS - «Feniks»



One more trend in the development of Russian AD systems (and the Russia-originated ones) is the introduction of the new MANPAD-type missiles into all legacy AD systems.

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ZSU-23-4M4 «Shilka-4M»

ZU-23M1 - «Strelets»

This trend includes the integration of all available AD assets (when Russians say 'integrated air defences' they mean what they say): the «Shlem» («Helmet») C^2 system provides the capability to control up to 9 MANPAD/MANPAD-based modules aiming them into the predicted engagement points before targets appeared in the MANPAD operators' field of view and seekers detected the targets. The current Russian MANPAD modules provide the capability to fire two SAM simultaneously to complicate the employment of evasion manoeuvres against SAM and increase the probability of kill.

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JDP 0-30 emphasises that the information gathering is one of the key elements of the Air Power with satellites being one of the most effective information means – so it should not be surprising that the Russian air defence concepts pay attention to counteraction with space-based information gathering systems. A-60 (1LK222) «Sokol-Eshelon» airborne laser system is the representative example of the Russian approach to solving the task to isolate the battlefield. One could notice the laser beam-director in the hump on the top of the aircraft – as well as the programme's logo clearly depicting the main operational task of A-60 aircraft.

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A-60 «Sokol-Eshelon» (1LK222)

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3. Self-defence

The Russian air defence theoreticians and practitioners take very seriously the experience gained out of the recent armed conflicts – and apply the conclusions made on the base of the observed trends to the Russian air defence CONOPS (which is also exported along with Russia-originated air defence systems). It was concluded that the comparative threat to air defences represented by anti-radar missiles (ARM) should be reconsidered. Indeed, 65 per cent of air defence systems (both radars and SAM/AA) were lost in combat during the conflict in Yugoslavia in 1999 due to the use of PGMs with optronic (TV/laser/IR) seekers, not ARMs. That percentage was even higher during the Second Gulf War. That forced Russian military and air defence designers to make the far-reaching conclusions influencing both air defence tactics and the hardware acquisition.

One can see the net result of those conclusions on the following slide depicting a SA-20/S-300PM battalion. The most telling thing about this slide is that there is *no* any SA-20 equipment on it. What is pictured is the inflatable set imitating the main SA-20 battalion's characteristics in optic, thermal, and electromagnetic field with the accuracy within the margin of several per cent (which is the current design order of the Russian Armed Forces). The same sort of disguising inflatable sets are currently produced for all Russian main weapons systems and armaments. Sure that might be the comparatively effective self-defence device complicating the task of delivering SEAD air strikes.