

In Their Words: Russian A2/AD Characterization in the Baltics

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From the perspective of all the parties involved, tension between the countries of the North Atlantic Treaty Organization (NATO) and the Russian Federation have been rising over the last 16 years. Kimberly Marten of the Council on Foreign Relations describes the strained relationship in her 2017 report *Reducing Tensions between Russia and NATO*. She writes that, from the Russian perspective, the 2004 NATO inclusions of Estonia, Lithuania, and Latvia are of particular insult. This leaves already geographically separated Kaliningrad now also surrounded by “adversary” nations. From the perspective of the US and NATO, Russia demonstrably displayed its penchant for aggression with the annexation of Crimea in 2014 and support for Assad’s authoritarian regime in Syria (Marten, 2017). The perceptions and actions of all involved puts the Baltic Region at a dangerous convergence of NATO freedom of movement and Russian anti-access/area-denial (A2/AD).

Russia’s endeavor to bolster A2/AD capabilities in the region puts the impetus on US analysts and planners to consider and compare our own observations of their capabilities with what Russia claims it is practicing and training to. The narrative they are able to control via state media is part of their A2/AD strategy. By pushing rhetoric and propaganda relating to specific capabilities, they have the potential to deter or influence US and NATO courses of action in the region. Characterization from the Russian perspective will help NATO better assess risk and be prepared to ensure the security of its Baltic member nations.

Overview

Russia utilizes naval and ground-based integrated air defense systems (IADS) and, to a lesser extent, air interceptors to deny airspace and protect ground assets in the Baltic region. It employs a standard three-component approach to implementing its IADS: air surveillance, battle

management, and weapons (Mitchell Institute, 2019). While this basic approach is not new, Russia has increased its defense spending by 175% over the last two decades, attempting to modernize its equipment and increase capability (Wezeman, 2020). The plan for modernization was spelled out in the state armament program for 2011-2020 and summarized by UK analyst Julian Cooper in 2016 along with an assessment of actual implementation up to the date of writing. The plan outlines anticipated purchases of upgraded equipment in all three IADS segments, as well as fighter procurement (Cooper, 2016). Russia has also been vocal about the successes they have had in recent military exercises in the Baltic region, publicly demonstrating their ability to use both their surface-to-air systems as well as air interdiction. This is in addition to the increasing occurrence of NATO aircraft being intercepted by Russian fighters in airspace that had been uncontested previously (RT, 2020).

Air Surveillance

Whether A2/AD is enforced by air interceptors or surface-to-air missiles (SAMs), detection via air surveillance is the first step in the kill chain. This is primarily accomplished via early warning (EW) radars. Russia has built and widely proliferated EW radars since the beginning of the Cold War, with modern capabilities focusing on mobility, network integration, and technology that attempts to counter low-observable (LO) aircraft advantages (Bronk, 2019). A pinnacle example of this capability is the Nebo family of radars. While some variations exist between models, they can all generate 3-D tracks on multiple targets simultaneously while also utilizing multiple frequencies in an attempt to detect LO targets. Tracks detected by this system can also be fed directly to strategic SAM battalions, shortening the kill chain and reducing the burden of battle management (Bronk, 2019). The system is also mobile and rapidly deployable,

taking just 20 minutes to set up once parked (Kopp, 2009). Russia plans to have 100 advanced Nebo radars in service by the end of 2020 (Cooper, 2016).

Russian state media outlet TASS has been overt in advertising the effectiveness of the country's air surveillance efforts. It puts out weekly reports on the number "foreign spy planes" flying near the border, which normally total around 35 (TASS, 2020). In a November 2020 article, the Aerospace Force Deputy Commander-in-Chief summarized aircraft surveilled over the entire year: "Air defense alert forces detected and tracked over 1.5 million airliners, including about 3,600 foreign combat planes and over 1,300 spy aircraft (Yudin, 2020)." In these articles, TASS always mentions that no violation of Russian airspace was allowed by any foreign aircraft (TASS, 2020).

Battle Management

Integration of overlapping systems is a modern approach Russia has implemented to better work through battle management and reduce the fog of war. One example of this is the passing of a target by a target acquisition radar at one SAM battery to a separate SAM battery which may be better positioned to engage the target. Russia takes advantage of multiple mediums of data passage in order to accomplish this and still maintain the rapid mobility of the IADS components (Bronk, 2019).

Russia has also recently demonstrated the ability to integrate naval forces into their A2/AD effort. During the 2020 iteration of the annual Baltic exercise, Ocean Shield, 30 ships along with "naval aviation, coastal troops, air defence and marines" integrated to practice "repelling enemy air strikes, defeating its naval forces, searching for and destroying submarines, and landing tactical assault force (MDRF, 2020)." This builds on the success hailed by Russian president Vladimir Putin in Ocean Shield 2019 where 58 aircraft from four different

geographically assigned fleets successfully integrated to protect 70 surface vessels (TASS, 2019).

Weapons

The key components of modern target engagement by the Russian ground-based IADS are the strategic SAM batteries, specifically the long-range SA-20 and SA-21. The SA-21, outfitted with the 40N6 missile, has an advertised range of over 200 NM (ROE, 2020). These are doctrinally used to protect high-value targets and centers of gravity. Integrated with the long-range strategic SAMs are also a combination of medium-range SAMs such as the SA-17, SA-15, and SA-22. This complicates attempts to suppress the IADS as the medium-range SAMs primarily serve to protect the strategic SAMs and critical battle management nodes. Closest to geographic edge of the denied airspace are also normally man-portable air defense systems (MANPADS) such as the SA-24 and -25, as well as Anti-Aircraft Artillery (AAA) batteries, effectively denying low-altitude flight by aircraft attempting to stay below the air surveillance radar horizon (Bronk, 2019).

Protection of strategic SAMs is practiced regularly by the Russians and, in the case of the Baltic region, tactics, techniques, and procedures (TTP) development is done while NATO is conducting exercises in the area. This was the case in June 2020, when Russia claims to have monitored and mirrored the BALTOPS NATO exercise. They used Su-24s, -27s, -30s, and unmanned aircraft to simulate US and European aircraft attacking Kaliningrad while “the Fleet’s air defense forces outfitted with advanced radar stations and [Command, Control, Communications, Computers, and Intelligence] systems are accomplishing the procedures within the required time limits for deploying radars, detecting air targets and issuing the data to the command posts of anti-aircraft missile units armed with S-400 launchers (TASS, 2020).” S-400

is the Russian name for the NATO-designated SA-21, which was used in conjunction with the SA-22 and “naval aircraft” in this exercise (TASS, 2020). The SA-22, which the Russians refer to as the Pantsir-S1, was also used to help defeat notional land attacks in a separate exercise using the system’s 30mm gun. That exercise was accomplished by the Arctic Fleet in freezing conditions and 40+ mph winds and included a focus on time from stop to launch, emphasizing the importance the Russians place on rapid mobility. According to the fleet’s press office, the crews were able to meet their unspecified engagement time requirements (TASS, 2020).

The Ocean Shield exercise series has demonstrated the confidence Russia has in using its navy to deny potential NATO adversaries’ maritime freedom of movement in the area as well as protect its strategic SAMs. In 2019, three amphibious assault ships were able to “thwart a notional enemy’s air attack” by utilizing electronic warfare and kinetically engaging aircraft with AK-176 and AK-725 ship mounted AAA (TASS, 2019). While AAA does not pose as significant of a threat to higher altitude NATO aircraft, Ocean Shield 2019 also included live fires of the Bal and Bastion anti-ship missiles. These super-sonic cruise missiles were able to “defend the seacoast of the Kaliningrad Region,” against notional targets and are “capable of operating in any weather conditions, day and night, with its full autonomous guidance after launches, under an enemy’s intensive fire and jamming. (TASS, 2019).” Figure 1 depicts the general rings of effectiveness for Russian sea and land-based weapons in the Baltics.

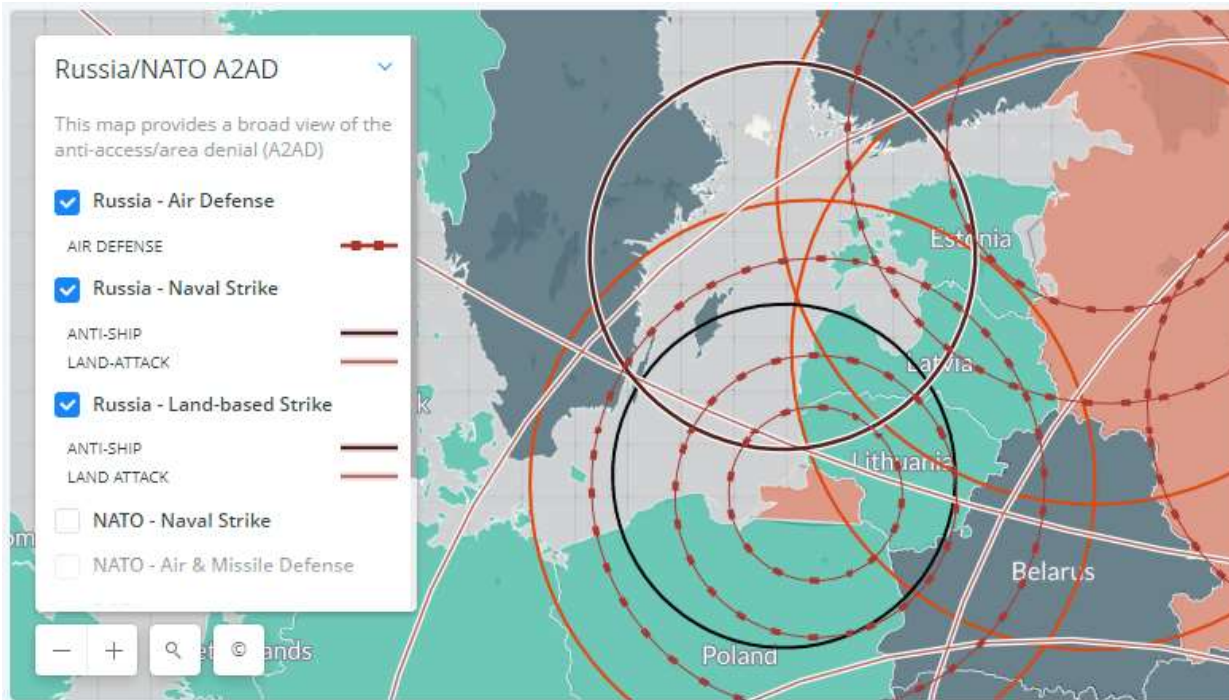


Figure 1: Russian IADS rings of effectiveness covering the Baltic region

Air Intercept

The most capable fighter currently operational in the Russian inventory is the Su-35. For comparison, its most direct NATO competitors are the F-15C and F-15E. The capabilities of the jet as advertised by Russia include supermaneuverability via thrust vectoring with a max airspeed of Mach 2.25, a max weapons load of 8000 kg, over a dozen different air to air and air to ground weapons compatible, and a combat radius of 1580 km (ROE, 2020).

For all its strengths, the Su-35 is still a 4th-generation fighter lacking the LO characteristics and modern avionics of US 5th-generation aircraft. Russia's attempt to level the playing field is the Su-57, which is touted as an LO, 5th-generation, multirole fighter. Acquisition of the new jet is slow, however, with five aircraft expected to be delivered by the end of 2021 (TASS, 2020).

While not as advanced or capable as the ground-based IADS at providing A2/AD, Russia has proved its willingness and capability to respond and intercept NATO aircraft it feels are threatening. State media claims that from January to November of 2020, Russian fighters were scrambled “over 170 times to intercept foreign planes near Russia’s borders (TASS, 2020).” As previously mentioned, the integration of air with naval and ground assets into Ocean Shield in recent years has been a celebrated success in the Baltics.

Conclusion

Russia continues to build its capability to deny air, land, and sea access to NATO in the Baltics by way of new equipment acquisition, joint exercises, real-world experience, and controlling the public narrative regarding all of it. Its expenditures on upgraded radars, SAMs, and aircraft are designed to specifically counter US and NATO capabilities and TTPs. The exercises they conduct, specifically Ocean Shield, demonstrate their concern for needing to protect areas such as Kaliningrad as well as deny NATO freedom of movement. Each iteration of the exercise also improves their proficiency and refines their TTPs. Finally, Russia is vocal about and takes advantage of real-world opportunities to test their capabilities. This is specifically on display with their propensity for intercepting US aircraft, advertising the number of aircraft they have surveilled, and widely distributing the successes they have had in major exercises. The combination of these efforts has resulted in an increase in Russia’s ability to enforce A2/AD. Continuing to observe the advertised strengths and successes that Russia has achieved is critical to gain insight on Russian perspective, mitigate the rhetoric arm of their A2/AD strategy, and inform the innovation, planning, and TTP development required in order to ensure NATO security in the Baltics.

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