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## Student Analysis—March 8, 2019

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### **(U) Russia: S-500 Development and its Threat to U.S. Interests**



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**(U) The S-500 Surface-to-Air Missile System is likely to pose a direct military threat to the United States and its allies in conflict zones around the world.** The Russian military began development of the S-500 in 2009 to create a SAM/ABM system capable of countering modern ballistic missile threats to the Russian Federation. The system is intended to replace both the S-300 SAM system and the A-135 ABM system in conjunction with the S-400.<sup>i</sup> The Russian military is in the late stages of testing the weapons system and plans to field up to 10 S-500 battalions by 2020. The system is planned to be deployed to areas around Moscow, as well as other sensitive locations for the Russian military. According to Russian media outlet Zvezda, Russian soldiers are currently training on the platform, the first group of which will graduate in 2019.<sup>ii</sup>

**(U) The S-500 will likely threaten existing U.S. strike capabilities and will likely change the way the West addresses and eliminates threats.**

- The use of low-frequency digital VHF radar systems will enable the system to track US stealth aircraft. China has reportedly developed a system that has been able to track US F-22 Raptors over South Korea.<sup>iii</sup> We assessed that Russia has developed similar capabilities with its Podsolnukh-E over-the-horizon radar systems.<sup>iv</sup>
- On May 25th, the Russian military conducted its third test of the S-500 and was reported to have hit a target over 300 miles away, the longest confirmed SAM hit to date.<sup>v</sup> When coupled with the 91N6A acquisition radar system, the system will likely be capable of acquiring targets up to 370 miles away.<sup>vi</sup>
- In the event of a conflict, the S-500 is likely to be targeted at US low-orbit imagery satellites to deny IMINT on the battlefield.<sup>vii</sup> The 77N6-N kinetic-kill missiles are capable of intercepting and impacting orbiting objects.<sup>viii</sup>
- The S-500 system has high mobility in order to evade counter-battery strikes. The missiles are also reported to have special containers that would prevent detection from satellite electromagnetic sensors, overall making the system considerably more difficult to track.<sup>ix</sup>

**(U) The S-500 is likely to be present in future conflict zones, given previous Russian deployment of the S-400.**

- In 2016, Russian military deployed the S-400 to bases in Syria, specifically Humayyim Air Base in Latakia and 13 km northwest of Masyaf in Hama.<sup>x xi</sup>
- Russia deployed S-400 systems in Crimea after it was illegally occupied by Russian troops in 2014.<sup>xii</sup>
- The Russian military has sold export versions of the previous S-400 iterations to the India, China, Algeria, Belarus and likely India to bolster their air defense capabilities.<sup>xiii</sup>
- Russia is likely to develop an export model of the S-500 system to support Russian allies.



Russian S-400 battery deployed in Syria

**(U) S-500 deployment is likely to present challenges to Western military doctrine in future conflicts as well as the modern export market.**

- The S-500 will likely be a competitor to the U.S. Terminal High Altitude Air Defense (THAAD) and Aegis missile systems, both on the battlefield and on the export market.<sup>xiv</sup>  
<sup>xv</sup> Systems have similar capabilities and fill the same doctrinal role.
- If the S-500 was to be deployed to Syria in one of the many Russian bases, the system could cover close to the entirety of the country, posing a direct threat to U.S. and allied air assets in the area. S-500 systems could be used to destroy incoming Israeli F-35B fighters, something the Syrian military was previously unable to counter.
- Given the presence of these systems in future combat zones, U.S. AWACS and EW are impacted due to the S-500's long range. AWACS and EW aircraft would be forced to operate further away from the battlefield, significantly affecting their operational capabilities in combat.

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<sup>i</sup> <https://www.globalsecurity.org/wmd/world/russia/abm3.htm>

<sup>ii</sup> Брацкий, Ян. "Российская армия получит новейшие ЗРС С-500." Телеканал «Звезда». Accessed March 05, 2019. <https://tvzvezda.ru/news/forces/content/201903010600-yf2v.htm>.

<sup>iii</sup> "New Threat Radars Present Intel Challenges." EW Europe 2018: New Threat Radars Present Intel Challenges - DB - Digital Battlespace - Shephard Media, [www.shephardmedia.com/news/digital-battlespace/ew-europe-2018-new-threat-radars-present-intel-cha/](http://www.shephardmedia.com/news/digital-battlespace/ew-europe-2018-new-threat-radars-present-intel-cha/).

<sup>iv</sup> Ike, John. "Weapons of Mass Destruction (WMD)." Podsolnukh-E over-the-Horizon Surface-Wave Radar, [www.globalsecurity.org/wmd/world/russia/podsolnukh.htm](http://www.globalsecurity.org/wmd/world/russia/podsolnukh.htm).

<sup>v</sup> Trevithick, Joseph. "Russia's S-500 Air Defense System Reportedly Hits Target Nearly 300 Miles Away." The Drive, 24 May 2018, [www.thedrive.com/the-war-zone/21080/russias-s-500-air-defense-system-reportedly-hits-target-nearly-300-miles-away](http://www.thedrive.com/the-war-zone/21080/russias-s-500-air-defense-system-reportedly-hits-target-nearly-300-miles-away).

<sup>vi</sup> Kopp, and Carlo. "Almaz-Antey S-500 Triumfator M Self Propelled Air / Missile Defence System / SA-X-NN / Самоходный Комплекс Противоракетной / Противосамолетной Обороны С-500 «Триумфатор-М»." Air Power Australia - Home Page, 15 June 2011, [www.ausairpower.net/APA-S-500-Triumfator-M.html](http://www.ausairpower.net/APA-S-500-Triumfator-M.html).

<sup>vii</sup> Arg. "S-500." S-500 Long-Range Air Defense and Anti-Ballistic Missile System | Military-Today.com, [www.military-today.com/missiles/s500.htm](http://www.military-today.com/missiles/s500.htm).

<sup>viii</sup> "S-500 Prometheus 55R6M Triumfator-M Air Defense Missile Data Pictures Video." Global Military Army Magazine Defence Security Industry Technology News Exhibition World Land Forces - Army Recognition, 16 Mar. 2018, [www.armyrecognition.com/russia\\_russian\\_missile\\_system\\_vehicle\\_uk/s-500\\_prometheus\\_55r6m\\_triumfator-m\\_air\\_defense\\_missile\\_data\\_pictures\\_video.html](http://www.armyrecognition.com/russia_russian_missile_system_vehicle_uk/s-500_prometheus_55r6m_triumfator-m_air_defense_missile_data_pictures_video.html).

<sup>ix</sup> "Below the Radar: Russia's S-400, S-500 Set to Become Invisible to Enemies." *Sputnik International*, 14 June 2016, [sputniknews.com/military/201606141041287832-russia-s400-s500-invisibility/](http://sputniknews.com/military/201606141041287832-russia-s400-s500-invisibility/).

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<sup>x</sup> Binnie, J., & O'Connor, A. - IHS Jane. "Second Russian S-400 in Syria Confirmed." Second Russian S-400 in Syria Confirmed | Jane's 360, [web.archive.org/web/20171002012653/http://www.janes.com/article/74500/second-russian-s-400-in-syria-confirmed](http://web.archive.org/web/20171002012653/http://www.janes.com/article/74500/second-russian-s-400-in-syria-confirmed).

<sup>xi</sup> Marcus, Jonathan. "Russia S-400 Syria Missile Deployment Sends Robust Signal." BBC News, BBC, 1 Dec. 2015, [www.bbc.com/news/world-europe-34976537](http://www.bbc.com/news/world-europe-34976537).

<sup>xii</sup> "Russia Amasses 32,000 Troops, Iskander and S400 Systems in Crimea – Ukraine." Information Agency, UNIAN, 24 Apr. 2018, [www.unian.info/politics/10093373-russia-amasses-32-000-troops-iskander-and-s400-systems-in-crimea-ukraine.html](http://www.unian.info/politics/10093373-russia-amasses-32-000-troops-iskander-and-s400-systems-in-crimea-ukraine.html).

<sup>xiii</sup> "S-400." Deagel.com, [www.deagel.com/Artillery-Systems/S-400\\_a000371001.aspx](http://www.deagel.com/Artillery-Systems/S-400_a000371001.aspx).

<sup>xiv</sup> <https://www.mda.mil/system/thead.html>

<sup>xv</sup> [https://www.mda.mil/system/aegis\\_bmd.html](https://www.mda.mil/system/aegis_bmd.html)