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Major Mark Stevenson

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AIM

1. Mounting tensions between Russia and NATO have led to increased attention towards Russia's Anti-Access/Area Denial (A2AD) capabilities. Despite, or perhaps due to, this increased attention there remains confusion surrounding what A2AD actually means and what are the implications for NATO. The CAF and its allies now face contested operational environments, where the dense and layered A2AD capabilities of peer adversaries can create an extremely lethal battlespace. This has led CAF and NATO leaders to ask, *what should they do to overcome this challenge? What is the role of "stand-in" and "stand-off" capabilities in these operational situations?* This paper will explain A2AD, how it constitutes a significant but not insurmountable challenge, and what must be done counter it.

INTRODUCTION

2. For several years now Russia has been deploying numerous advanced military systems that it claims are defensive in nature.¹ These systems grouped together have been coined by the West as 'Anti-Access/Area-Denial' (A2AD) systems. Notwithstanding the increased emphasis, A2AD is itself misunderstood by many, and often misrepresented. To properly evaluate the implication to NATO a common starting point must be established for analyzing A2AD. At its core A2AD is a layered defence that is integrated.² This is not new; it is a defensive concept as old as warfare itself. From the Spartans at Thermopylae, to Hitler's Atlantic Wall to Russia's modernization of Kaliningrad, all are examples of applying an A2AD concept using cutting edge military equipment. The intent is to prevent the adversary from massing their forces for invasion (Anti-Access) and then deny them freedom of movement when battle is joined (Area-Denial).³ What makes the current Russian use of A2AD intimidating is the volume of modern weapon systems deployed and the ranges that many of the systems possess.

3. Previous historical examples of employing A2AD can clearly be seen as defensive. The ranges and capabilities of the current Russian weapons, however, raise concerns typically associated with offensive weapons. In Kaliningrad particularly, the largest weapon systems typically associated with A2AD range well into the Baltic Sea and over several NATO countries.⁴ The typical depiction of these ranges as neat circles on maps reinforce the impression that NATO is unable to operate within these areas. Although the Russian systems are highly capable, exploiting or creating weakness in integrated, layered defenses is nothing new for NATO forces. Defeating A2AD, is conceptually no different than analyzing how to defeat any other type of defensive system. The individual components must be assessed for their comparative strength and weaknesses to friendly force capabilities. Where weaknesses or friendly force advantages exist, they must be exploited to further degrade the overall defensive system.

¹ Sergey Sukhankin "From 'Bridge of Cooperation' to A2/AD 'Bubble': The Dangerous Transformation of Kaliningrad Oblast", *The Journal of Slavic Military Studies*, 31:1 (2018): 21.

² Keir Giles and Mathieu Boulegue "Russian A2/AD Capabilities: Real and Imagined," *Parameters* 49 (Spring-Summer 2019): 24.

³ (Sukhankin 2018), 16.

⁴ (Sukhankin 2018), 34.

DISCUSSION

4. There are numerous weapon systems that are associated with an A2AD defense. This paper will focus on the longer range systems as these pose both a military and political challenge to NATO. Militarily their range pose a challenge as many avenues of approach for NATO reinforcements are now within range of these systems.⁵ Politically they are a challenge as the range of these systems now cover significant portions of several NATO countries. Millions of civilians live with the increasing perception that they live under a threat umbrella instead of a NATO security umbrella. The disparity of declared ranges between Russian missiles and their NATO counterparts only contributes to this perception. This paper is not intended to analyze the technical specifics of weapons systems, however an overview of the disparity between Russia's 'big three' missiles: the Iskander, Onyx and S-400, and their NATO counterparts will illustrate the existing delta.

5. The Iskander system is capable of launching two different missile variants: a Theatre Ballistic Missile (TBM), or a cruise missile.⁶ Both missiles have a proven range of over 400km, with the suspected range of the cruise missile being significantly longer than 500km.⁷ By comparison the US Army Tactical Missile system (ATACMS) has a range of only 300km, while US cruise missile were previously restricted to less than 500km range due to the Intermediate-Range Nuclear Forces (INF) treaty.⁸ Although this paper does not advocate for withdrawing from long standing treaties, the recent withdraw of the US from the INF treaty will enable it to develop counters to Russia's improved cruise missile capabilities. In addition to the range overmatch of these Russian missiles, the cruise missile is also hypersonic and capable of high-speed maneuvers, in excess of 20-30Gs, significantly challenging existing missile defence technologies.⁹

6. The Onyx system is an anti-ship missile, which is also capable of targeting land-based targets. Russia has deployed air, land and sea based launching systems making this a persistent and highly mobile capability. The missiles have a sustained cruising speed of Mach 2.5 with a range of over 600km.¹⁰ By comparison the US's new Long Range Anti-ship Missile (LRASM), first fielded in 2018, is subsonic with a maximum range of only 370km.¹¹ With the Onyx's range and variety of launching platforms virtually the entire breadth of the Baltic Sea can be targeted from Kaliningrad based platforms. This challenges NATO's influence in the Baltic Sea and its ability to reinforce the Baltic States in the event of conflict.¹²

⁵ (Giles and Boulegue 2019), 24-25

⁶ Kemp, Herb PhD. "Strategic Security in Northern Europe: The Implications of Russian Anti-Access/Area Denial Strategies in Developing Complex Threat Environments." *Journal of Strategic Security* 14, no. 1 (2020): 80.

⁷ Yury Fedorov, "American Balistic Missile Defence, Russian Iskanders and a New Missile Crisis in Europe," *Chatham House*, (May 2009): 4.

⁸ (Herb Kemp 2020), 80.

⁹ Report for Congress, *Hypersonic Weapons: Background and Issues for Congress* (Washington DC: United States of America: Congressional Research Service, 2019), 4-5, 11.

¹⁰ (Herb Kemp 2020), 81.

¹¹ Janes Defense News "BAE Systems contracted to manufacture seekers for LRASM Lots 4/5" last modified 30 July 2021, BAE Systems contracted to manufacture seekers for LRASM Lots 4/5 (janes.com)

¹² (Giles and Boulegue 2019),24-25.

7. The Russian surface to air S-400 system rounds off the ‘Big three’ systems usually associated with A2AD.¹³ The S-400 system can be used in several different roles including air-defense (AD) and anti-ballistic missile (ABM) defense.¹⁴ In the AD role it has more than twice the range of its Patriot PAC 2 counterpart at 400km range vs 160km range respectively.¹⁵ Conversely, in the ABM role the S-400 reportedly has a range of only 60km compared to the US Theatre High Altitude Area Defense (THAAD) with a range of over 200km. Currently, however, there are no THAAD systems deployed to Europe and many NATO countries instead use the NATO Surface-to-Air Missile System (NASAMS).¹⁶ The NASAMS typically has a maximum range of 30km, depending on the missile in use. Although NATO defence industries are working to develop compatible missiles for the NASAMS with extended ranges, the current capabilities of the S-400 compared to its counterparts represents a significant overmatch.

8. The superior range, and in many cases superior capabilities, of Russian long range missiles systems means that the range and technological over match previously enjoyed by NATO coalitions would not be present in a near-term conflict with Russia. The role of ‘stand-in’ or penetrating systems are therefore increasingly relevant. Stand-in systems are those that are capable of operating within the contested A2AD areas. Two key capabilities are anticipated to play a significant role as ‘stand-in’ assets. Penetrating aircraft, particularly the B-2 stealth bomber and its replacement the B-21, and Special Operations Forces (SOF) provide NATO the ability to degrade A2AD defenses.¹⁷ Teaming these assets together will be a force multiplier that will allow NATO forces to create gaps in the A2AD systems for less subtle forces to exploit.

9. The B-2 bomber was originally designed to increase the credibility of the US’s nuclear deterrence.¹⁸ The capabilities of the aircraft, and the expected capabilities of its replacement, the B21, means that it also significantly increases NATO’s conventional deterrence. By having compatible air-to-surface missiles, the stealth bombers will be able to target the long range A2AD systems covering specific areas.¹⁹ With the S-400 systems neutralized, airborne battle management, Surveillance and Reconnaissance assets could then approach the airspace to improve conventional targeting of remaining systems by air, land and sea.²⁰ The anticipated challenge for the stealth bombers will be finding the Russian systems to target them. Russia possess highly mobile launch platforms for all the systems previously mentioned. NATO militaries do not have an enviable record of successfully targeting mobile launch platforms. Significant portions of coalition aircraft were allotted to ‘scud hunting’ in Operation DESERT

¹³ (Herb Kemp 2020), 81.

¹⁴ (Herb Kemp 2020), 81.

¹⁵ (Herb Kemp 2020), 81.

¹⁶ Kongsberg Defence & Aerospace, “NASAMS Air Defence System” Last Accessed 19 January 2022, <https://www.kongsberg.com/kda/products/defence-and-security/integrated-air-and-missile-defence/nasams-air-defence-system/>

¹⁷ Harry Foster “The Joint Stealth Task Force: An Operational Concept for Air-Sea Battle,” *Joint Force Quarterly*, issue 72 (1st Quarter 2014): 52.

¹⁸ Bill Sweetman, “Stealth Aircraft-History, Technology and Outlook,” *Jane’s Information Group (USA)*, (Alexandria, VA, 1990), 5.

¹⁹ Report for Congress, *Air Force B-21 Raider Long-Range Strike Bomber* (Washington DC: United States of America: Congressional Research Service, 2021), 3.

²⁰ (Herb Kemp 2020), 81-82.

STROM will limited result.²¹ If stealth bombers are unable to attain precise, real-time, data of the launcher locations, their ability to enter the contested airspace will be a moot point. It is likely that, in addition to the forces mentioned, Russia will also likely use the space, cyber and information domains to further challenge NATO's access to accurate targeting data of its mobile launch systems. The effectiveness of stealth bombers might come down to the effectiveness of other stand-in assets to provide real-time targeting data.

10. SOF elements have been envisioned to operate deep behind enemy lines for virtually the entire history of SOF. The British Special Air Service has its roots as the long-range patrol groups that would move hundreds of kilometers behind Axis lines through the north African desert to target unsuspecting airfields, C2 nodes and troop accommodations.²² US SOF were originally conceived for a similar role, which they have performed throughout their history from Vietnam to present, including particularly the opening phases of OP ENDURING FREEDOM in Afghanistan. Notable on OP ENDURING FREEDOM they provided the targeting data for coalition strike aircraft to target Al-Qaeda and Taliban forces.²³ This tradition will likely prove decisive in any future conflict with Russia, given their numerous covert insertion methods.

11. SOF elements will be required to deploy into A2AD areas to provide real time, on the ground targeting data. With current portable targeting systems, SOF teams will be able to remain a significant distance from the targets while providing the coordinates through low visibility, or expendable remote, communications systems. These missions will certainly be high risk but, if properly planned and resourced, will provide short term windows of precise targeting data on key systems even in GPS denied, space and cyber contested environments. Once stand-in forces have provided weak points in the A2AD defense it will be up to the stand-off forces to further enlarge and maintain the gaps in the defense.

12. NATO's stand-off forces will need to be closely coordinated with the stand-in operations. Once stand-in forces create gaps it is prudent to expect that Russia would act quickly to close these gaps with other mobile launchers. Stand-off forces will therefore need to act very quickly once gaps are open and use their advantage to maintain and enlarge these gaps. If air, land and sea launched systems can quickly mass effects through the gaps, coordinated by airborne Battle management, Surveillance and Reconnaissance aircraft, the degradation of the A2AD systems will prove decisive.

²¹ Department of the Air Force, *Gulf War Air Power Survey Volume 2: Operations and Effects & Effectiveness* (Washington, DC.: 1993), 190.

²² Gavin Mortimer, "Pirates of the High Desert," *World War II* vol 25, issue 2 (Jul/Aug 2010): 38-45, <https://web-p-ebshost-com.cfc.idm.oclc.org/ehost/detail/detail?vid=0&sid=73e4abf2-4920-4853-9198-7b9d402b0f3d%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXR1#AN=51237031&db=mth>

²³ Wright, Donald P., et al. *A Different Kind of War: The United States Army in Operation ENDURING FREEDOM, October 2001–September 2005*. Fort Leavenworth, KA: Combat Studies Institute Press, 2010, 46.

CONCLUSION

13. The deployment of Russian A2AD systems is a threat that must be taken seriously by NATO, but is not an insurmountable challenge. There are numerous deficiencies in NATO's current stand-off armaments compared to Russia. The deficiencies, however, are known and most can be overcome by upgrading existing technologies. Thus NATO does not need cower to Russian influence due to their A2AD capabilities, but instead must refocus their defense industry toward these conventional threats. Matching Russia's long range systems will reduce the threat perception that several NATO countries have towards the deployed A2AD systems, as well as improve NATO's deployment options. NATO's existing and anticipated stand-in systems possess the capabilities required to facilitate break-in operations to contested areas. Ensuring NATO can effectively exploit a break-in must be a critical focus of NATO militaries.

RECOMMENDATION

14. A2AD defenses do not make impenetrable bastions of Russian control. Penetrating, degrading and ultimately defeating Russia's A2AD systems is achievable, but will be costly, especially with the current disparity between Russian and NATO capabilities. If attention and investment are focused in the correct areas NATO can overcome this challenge. This paper makes several recommendations for NATO forces in order to maintain a credible deterrence to aggression and, if necessary, employ in the event of open conflict.

15. NATO must maintain and improve its current stand-in capabilities. The US's B21 stealth bomber project is reportedly on track to begin delivery of 100+ bombers beginning 2022-2023.²⁴ Ensuring that NATO SOF elements have the discrete ISR and communications abilities to conduct targeting in direct support of stealth bombers will be a critical force multiplier for NATO. Both SOF and the stealth bombers must have redundancy in targeting techniques to operate with GPS denied while maintaining minimal emission signature. Applicable NATO elements should prove this concept in contested environment exercises.

16. Many of NATO's stand-off capabilities are at a disadvantage to Russian defenses. NATO should renew emphasis on developing stand-off capabilities to reduce reliance on the limited number of stand-in assets. Improved stand-off capabilities will also provide creditable reassurance to the millions of NATO civilians that currently live within range of Russian stand-off weapons.

17. There are many Tactics Techniques and Procedures (TTPs) for operating in contested and denied environments. Alternate navigational systems and target identification can compensate for GPS denial. Emission controls can reduce electromagnetic signatures. Use of emerging air, land and sea based expendable autonomous systems can enable communications and ISR while denying the enemy intelligence on the actual friendly force elements operating. These TTPs, however are not consistently well developed and practiced among NATO militaries.²⁵ TTPs and the applicable assets required to enable operations in contested environments, where the

²⁴ (Gertler 2021), 9-10.

²⁵ Adam Lenfestey, Nathan Rowan, James Fagan, & Corey Ruckdeschel, "Achieving Secrecy and Surprise in a Ubiquitous ISR Environment," *Joint Force Quarterly*, issue 88 (1st Quarter 2018): 87.

adversary has superiority in several domains, need to be improved, disseminated and practiced by NATO militaries.

18. An additional aspect not directly part of A2AD defenses but relevant to Russia's evolving way of war is their use of cyber and information domains. Any offensive action by Russia is likely to have a coordinated misinformation campaign supported by cyber technologies that challenge NATO's ability to offer an effective counter narrative. It is beyond the scope of this paper to properly evaluate the impact of these abilities on NATO options. It is recommended that a future topic be considered to address the growing influence the cyber and information domains will play in the opening phases of a conflict. Although NATO, as a coalition, may have the conventional military forces required for a conflict, the ability to deploy and subsequently employ these forces in a conflict may come down to NATO's ability operate in these emerging and highly contested domains.

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