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CANADA, NORAD, AND NORTH AMERICAN SECURITY COOPERATION IN A NEW GEOSTRATEGIC ENVIRONMENT

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INTRODUCTION

Over 53 years ago, at the dawn of human space exploration, the United Nations General Assembly adopted a resolution which established the Outer Space Treaty (OST). This treaty, which came into effect in 1967, instituted the basic framework for access to and the peaceful use of outer space.[1] It was meant to foster cooperation in space among nations, the space race between the United States (US) and the former Union of Soviet Socialist Republics (USSR) notwithstanding. In those early days of space exploration, only a handful of countries had satellites in space, and only three countries—France, the US, and the USSR—possessed space launch capabilities.[2] Since then, the rapid advances in science and technology have led to the commercialization of space and the surge of nations and non-government entities operating in space.[3] From simple driving directions to complex military command and control systems, ubiquitous space technologies have become integral to daily activities on earth.

The heavy reliance on space and the growing number of players in this domain have generated security concerns in recent years. In response, the heads of state and government of North Atlantic Treaty Organization (NATO) declared "space as an operational domain" during the North Atlantic Council in London on 04 December 2019. The London Declaration recognized "its [space's] importance in keeping us [NATO] safe

[1] Baiocchi and Wesler describe the 1967 OST as an agreement "to keep space open for exploration and use by all states, take responsibility for all activities conducted from within their borders (whether carried out by governmental or nongovernmental entities), assume liability for damage caused by their space objects, and cooperate with one another and provide mutual assistance." Dave Baiocchi and William Wesler IV, "The Democratization of Space," *Foreign Affairs* 94, no 3 (May/June 2015): 100-101.
[2] Union of Concerned Scientists, Satellite Data Base, https://www.ucsusa.org/resources/satellite-database
[3] *Ibid.*

and tackling security challenges, while upholding international law."[4] As expected, Moscow made known its displeasure on NATO's attempt for increased integration. A news article on CNBC.com quoted President Putin on this issue, saying that he was "seriously concerned about … the attempts to militarize outer space."[5] Simply put, Russia viewed NATO's declaration as a direct challenge to Russian dominance and influence in space.

Based on these developments, this essay will argue that NATO's declaration of space as an operational domain will usher in a new era of multi-domain competition with Russia. Furthermore, since kinetic action in space is high-risk for all parties, this essay will demonstrate that competition for space will most likely occur in other domains. This essay also proposes that Russia's cutting-edge counterspace technologies afford its military an advantage over NATO, which currently relies on member-nations' capabilities for space support. However, NATO's unrealized counterspace power through space integration and standardization and its influence over European Union (EU) space projects will serve as strong deterrents and defense against Russian counterspace technologies.

This essay will first analyze and define operational domain within the context of space and its implications on NATO's mission. Next, it will discuss the strategic interests of NATO and Russia in space in order to understand their respective security needs. This will highlight the similarities and, most importantly, potential areas of friction between

[4] North Atlantic Council, *London Declaration*, December 4, 2019, para. 6, https://www.nato.int/cps/en/natohq/official_texts_171584.htm
[5] Holly Ellyatt, "Putin Fears the US and NATO are Militarizing Space and Russia is Right to Worry, Experts Say," para. 28, December 5, 2019, https://www.cnbc.com/2019/12/05/nato-in-space-putin-is-worried-about-the-militarization-of-space.html

NATO and Russia. Using this knowledge, this essay will then discuss how a new era of multi-domain competition will unfold between these two entities. It will compare and contrast NATO and Russian strategies and capabilities for space security. Last, the essay will underscore the impetus for NATO to take swift and deliberate steps if the alliance wants to deter Russia and secure NATO's interests in space.

DEFINING "SPACE AS AN OPERATIONAL DOMAIN"

In order to understand how NATO values the space domain and the intended role of the alliance in space operations, it is important to examine the statement, "space as an operational domain." What does this mean and what are the implications of this declaration? Space domain and operations are straightforward concepts on their own as defined in the US *Department of Defense (DOD) Dictionary of Military and Associated Terms*.[6] Furthermore, while NATO's official definition of operations closely mirrors that of DOD, NATO does not have a definition for space or domain from the context of military operations. Despite this, the definitions offered by DOD and NATO are useful starting points and provide clarification on NATO's description of space as a domain and operations as a function. However, they do not provide insight on the implications of NATO's declaration.

Dr. Jared Donnelly and LCDR Jon Farley's functional definition for domain provides a framework for identifying and understanding the declaration's implications. In their analysis of multi-domain operations within NATO, Dr. Donnelly and LCDR Farley

[6] US DOD defines space domain as "the area above the altitude where atmospheric effects on airborne objects become negligible," and operation as the "sequence of tactical actions with a common purpose or unifying theme; or a military action or the carrying out of a strategic, operational, tactical, service, training, or administrative military mission." Department of Defense, *DOD Dictionary of Military and Associated Terms*, January 2020, 159 & 198, https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf?ver=2020-01-24-100230-123.

define domain as a "critical macro maneuver space whose access or control is vital to the freedom of action and superiority required by the mission."[7] This definition of domain, when applied in the context of space, makes space germane to security or military matters. It underscores the importance and the necessity of access and maneuver within the space domain in order to achieve specific security or military objectives.

Applying these concepts, NATO's declaration of space as an operational domain implies that the alliance intends to secure access, ensure freedom of action, and attain a certain degree of superiority in space in order to protect the interests of the alliance. As an operational domain, NATO intends to synchronize activities or actions to secure its military objectives. Simply put, NATO's declaration has inherent security characteristics aimed at protecting the collective interests of NATO members in space.

NATO'S STRATREGIC INTEREST IN SPACE

The preceding analysis on the motivation behind NATO's declaration underscores its renewed interest and emphasis on space. NATO understands the necessity and importance of space to both civil and security arenas. Stewart Patrick and Kyle L. Evanoff echo the centrality of space in contemporary civil and security operations, asserting that, "space is a global commons, a domain on which all states rely (to varying degrees), and in which they encounter shared threats that require collective security."[8] In relation to this, figure 1 from the Union of Concerned Scientists (UCS), illustrates the proliferation of space use between 1966 and 2016. Furthermore, the UCS estimates that

[7] Dr. Jared Donnelly and LCDR Jon Farley, "Defining the 'Domain' in Multi-Domain," JAPCC 2019 Conference Read Ahead, October 2019, 11, https://www.japcc.org/wp-content/uploads/JAPCC_Read_Ahead_2019.pdf

[8] Stewart Patrick and Kyle L. Evanoff, "The Right Way to Achieve Security in Space," *Foreign Affairs,* September 17, 2018, para 4, https://www.foreignaffairs.com/articles/space/2018-09-17/right-way-achievesecurity-space.

as of 30 September 2019, approximately 1,030 of the 2,218 satellites on-orbit are for commercial or jointly commercial and government purposes.[9] This commercialization of space has ballooned in recent years, giving countries and private citizens who normally would not have access to space the opportunity to benefit from space technologies.

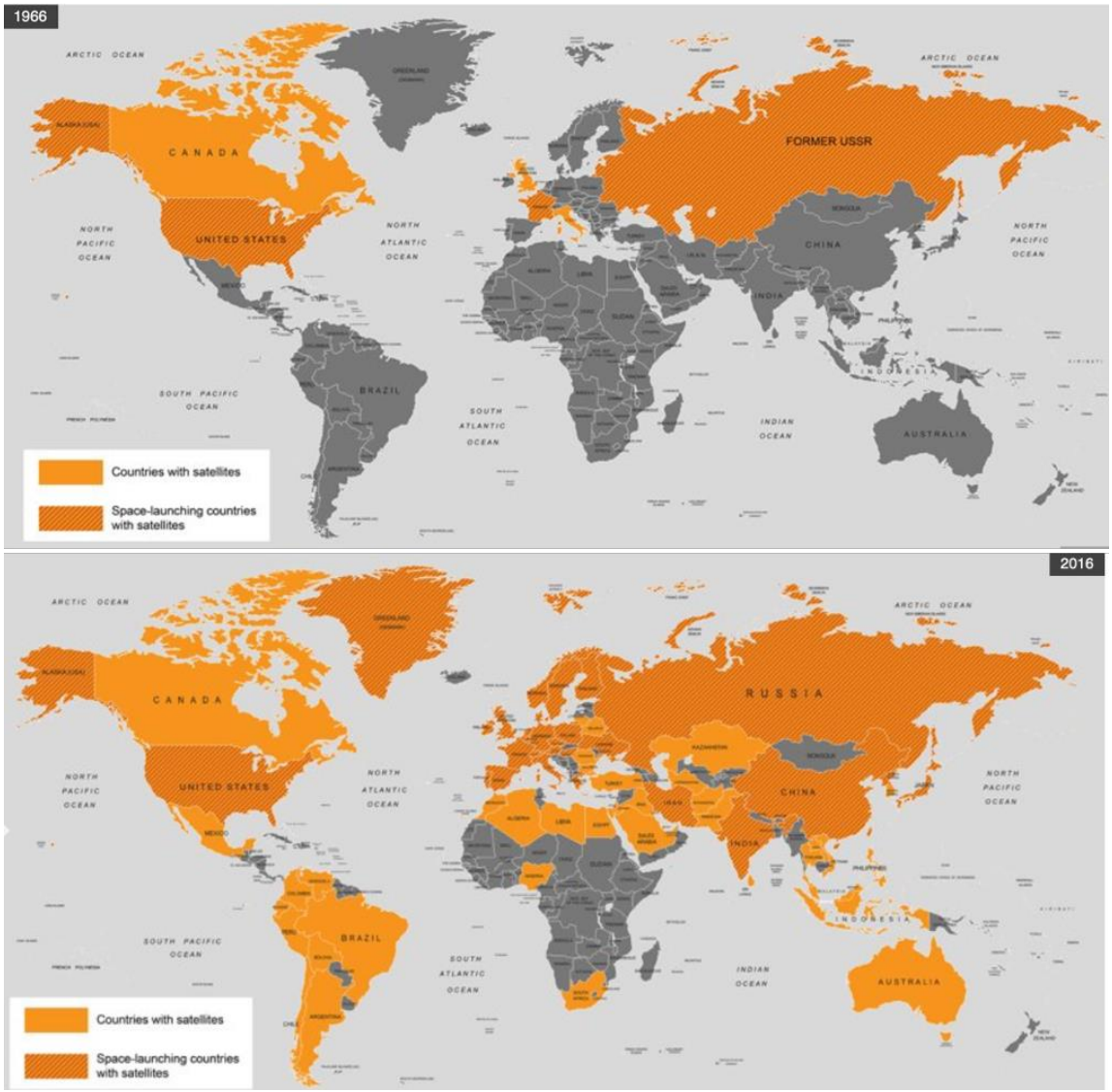

Figure 1. Who Has the Satellites? Now and Then
Source: Union of Concerned Scientists, *Who Has the Satellites? Now and Then*, https://www.ucsusa.org/resources/satellite-database

[9] Union of Concerned Scientists, Satellite Data Base, https://www.ucsusa.org/resources/satellite-database

Within NATO, member-states rely on civilian and commercial space resources to image the earth, forecast the weather, and provide global positioning, navigation, and timing (PNT), among other applications. In addition to the commercial application and civilian use of space, NATO relies on satellite communications (SATCOM) and space-based intelligence, surveillance, and reconnaissance (ISR) to execute its mission. These functions and capabilities underscore NATO's strategic interest in space. As a collective security organization, NATO is obligated to protect member-states' access to space and ensure its persistence as a global commons. From a military perspective, space functions underpin NATO security operations.

RUSSIA'S STRATEGIC INTEREST IN SPACE

In comparison to NATO, Russia also has a strong interest in civilian, non-military applications of space. As Pavel Luzin stresses, space exploration is beneficial to Russia's international prestige:

> "Since the early years of the Cold War, Soviet leaders and their Russian successors have used space exploration to legitimize their rule. Cooperation with U.S. and European space agencies, especially on long-term projects, is an especially pressing need for Russian authorities today. It demonstrates Russia's importance in the international system and showcases Moscow's technological prowess."[10]

In relation to this, Russia through Roscosmos, a commercial but government-controlled space organization, plays a central role in the maintenance of the International Space Station and in the development of ExoMars project, a joint endeavor with the European Space Agency.[11] These programs demonstrate the profound interest of Russia in space exploration and how space is linked intrinsically to Russia's standing in global affairs.

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[10] Pavel Luzin, "Russia's Position in Space, Cooperation and Decline," *Foreign Affairs,* September 21, 2016, para 5. https://www.foreignaffairs.com/articles/2016-09-21/russias-position-space.
[11] *Ibid.,* para 6-7.

Russia also considers space a critical component of its military strategy. The US Defense Intelligence Agency (DIA) assesses that for Russia, "achieving supremacy in space will be a decisive factor for winning in future conflicts."[12] Similar to NATO's use of space-based technology, Russia relies on ISR, SATCOM, and PNT to enable its military operations. Furthermore, Russia views space as the "Achilles Heel" of the US military superiority and, by extension NATO, making counterspace capabilities essential to Russian military strategy.[13] In addition, counterspace technologies not only serve as deterrence from future attacks, they also underscore Russia's potency in space.

The discussions in this section demonstrate similar and divergent interests between NATO and Russia in space. Both rely on the commercial and civil applications of space, presenting each with the responsibility to secure access in this domain. However, while NATO's predominant view of space is from a utilitarian perspective, Russia views it both as a source of prestige and a potential threat to its military. Russia, like NATO, appreciates the importance of space in military operations. But unlike NATO, Russia has developed counterspace capabilities to check US dominance and hold the US and its allies at risk.

COMPETITION IN MULTIPLE DOMAINS

The competing interests of NATO and Russia in space, the pervasiveness of space capabilities in military operations, and the anachronistic OST highten the insecurity of the space domain. To reduce and mitigate these challenges, NATO took initial steps to bolster its collective security in space through the 2019 London Declaration. On the other

[12] Defense Intelligence Agency, *Challenges to Security in Space*, February 11, 2019, 23. https://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/Space_Threat_V14_020119_sm.pdf
[13] *Ibid.*, 24.

hand, Russia turned to furthering its counterspace capabilities. These actions set the stage for a new era of competition that implicates other operational domains.

Indeed, a renewed focus in kinetic operations in space is important since actions against on-orbit space assets will yield direct and immediate results. Kinetic Anti-Satellite (ASAT) action against targets in space is the most direct and catastrophic tactic an adversary can take. Figure 2 illustrates DIA's "Counterspace Continuum" and describes the impact of different counterspace capabilities on space operations. Full-blown kinetic action in space will have a wide-ranging and nonreversible impact on other space systems because the debris from such attacks will endanger other space-based assets. The cost of these actions outweighs the benefits and would most likely be a last-ditch effort in response to a desperate situation. Therefore, actions in other domains that hinder access in space or disrupt operations in space are more likely in the near term.

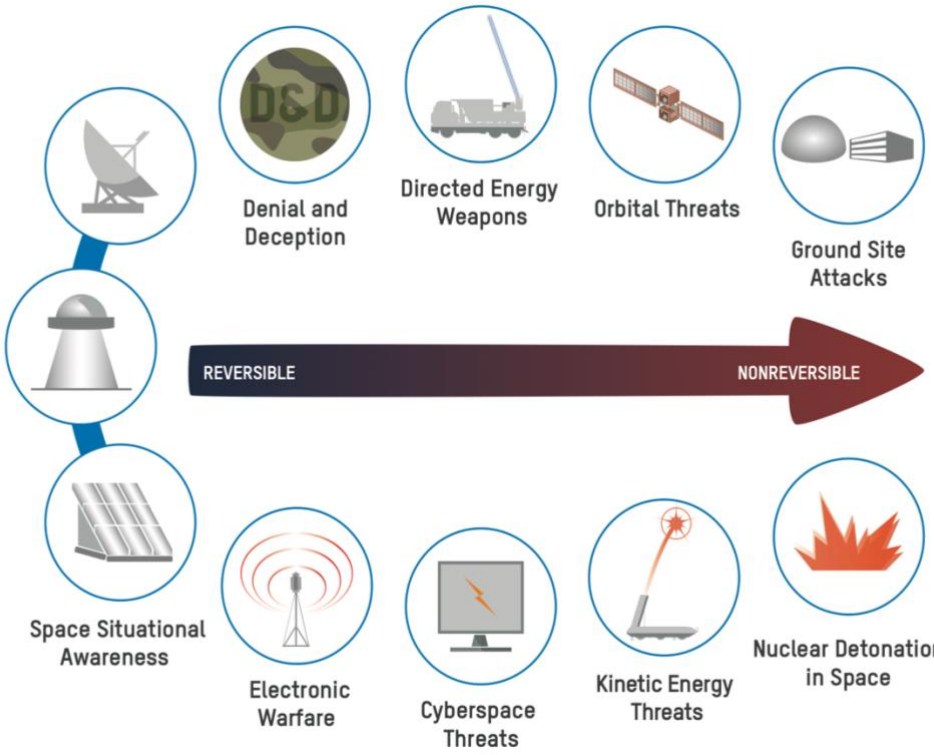

Figure 2. Counterspace Continuum
Source: Defense Intelligence Agency, *Challenges to Security in Space*, February 11, 2019, 36. https://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/Space_Threat_V14_020119_sm.pdf

Instead of viewing space as an exclusive battlespace, current sentiment among military leaders is that space should be regarded as part of a bigger strategy in a conflict or war. US Air Force General John E. Hyten, the former commander of the US Strategic Command and currently Vice-Chairman of the Joint Chiefs of Staff, explains in an article from *Air Force Magazine,* "it's not space for space's sake, there's no such thing as war in space, there's just war."[14] In other words, to gain superiority over adversaries in space and succeed in modern warfare, the military must not only deter and defend in space but also exploit the effects of multi-domain operations.

RUSSIA'S COMPETITIVE EDGE

Russia's competitive edge in space stems from its diverse counterspace technologies. As discussed previously, these capabilities are intended to deter the US military and its allies. The Center for Strategic and International Studies offers a glimpse into Russian multi-domain counterspace capabilities:

> "Overall, Russia poses a significant threat across all four counterspace weapon categories. Evidence suggests that the country is currently developing TEL-[transporter erector launcher] and air-launched direct-ascent ASAT weapons, co-orbital systems for on-orbit inspection, ground- and air-based laser weapons, and a world-class network of electronic weapons."[15]

Russia's capabilities to launch kinetic ASAT attacks from the ground and air are examples of multi-domain operations. They transcend multiple operational domains, including ground, air, cyber, and space, in order to achieve the desired effects.

However, Luzin surmises that, "more realistic is that in the event of a conflict, Russia could disrupt the satellite-based networks that are key to the U.S. military's

[14] Steve Hirsch, "There is No War in Space," *Air Force Magazine*, 29 May 2018, para. 46, https://www.airforcemag.com/article/There-is-no-War-in-Space/
[15] Todd Harrison, *et al.*, *Space Threat Assessment 2019*, Center for Strategic and International Studies, 24, https://aerospace.csis.org/wp-content/uploads/2019/04/SpaceThreatAssessment2019-compressed.pdf

supremacy in communications and intelligence by jamming satellites or destroying ground-based space infrastructure."[16] Russia may also interfere with space access and disrupt operations by conducting cyberattacks on the computer networks of space systems. These actions target various segments of space systems without directing kinetic action in space, thereby avoiding the catastrophic effects of space debris on other assets on orbit.

These multi-domain counterspace capabilities equip Russia with credible deterrents. As such, Russia will continue to pursue counterspace capabilities because space is not just a matter of security, but also of national prestige. These factors increase uncertainty and insecurity in space. They trigger competition, increasing the risk for miscalculation and escalation. NATO must be ready to also deter and defend the alliance against Russian aggression in space and related domains.

STRENGTH IN THE ALLIANCE

NATO currently does not possess organic counterspace capabilities. It relies on space-capable members (such as Canada, France, Italy, and the US) for space capabilities to defend the alliance.[17] The 2019 London Declaration marks an important step towards building a coherent space strategy within NATO. As NATO Secretary General Jens Soltenberg declares, "this can allow NATO planners to make a request for allies to provide capabilities and services, such as satellite communications and data imagery."[18]

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[16] Pavel Luzin, "Russia's Position in Space, Cooperation and Decline," para 12.
[17] Flavio Giudice, *et al*., "The Continued Evolution of Space Effects and Capabilities Within NATO Trident Exercises," *The Three Swords Magazine* 32, (2017): 81, http://www.jwc.nato.int/images/stories/_news_items_/2019/three-swords/NATOSpaceSupport2019.pdf
[18] Holly Ellyatt, "Putin Fears the US and NATO are Militarizing Space and Russia is Right to Worry, Experts Say," December 5, 2019, para. 11, https://www.cnbc.com/2019/12/05/nato-in-space-putin-is-worried-about-the-militarization-of-space.html

NATO's declaration paves the way for aligning the various space efforts of member countries into a coherent space policy in support of NATO's collective security.

As NATO matures and executes its space policy, the resulting standardization and interoperability of space operations will lead to resiliency.[19] This in turn provides a means to deter and defend against Russian interference in space. The resiliency of NATO's space operations ensures continuity in the event of an attack from Russia or other adversaries. This assurance increases the cost to the adversary because it must attack and disable multiple nodes in order to render space capabilities ineffective. Therefore, a resilient network of NATO or NATO-aligned space systems serve as deterrence for future attacks.

In addition to resiliency, allies who are also part of the EU can also leverage EU's Space Surveillance and Tracking (SST) resources to support space defense and security missions. This is possible because NATO's strategic interest mirrors EU's space policy in ensuring "freedom of action and autonomy" in space.[20] The EU SST is one of the projects designed to directly address this commitment. It encompasses both security and civil requirements for tracking of space objects in order to prevent collisions and monitor for potential nefarious activities in space. As Lt Col Console asserts, NATO members who are also EU nations can serve as proxies to provide SST capabilities to the Alliance.[21] Such a move will foster closer integration and interoperability between EU

[19] Lt Col Console defines resiliency "as robustness and survivability, i.e. the ability of a system to continue to operate or to rapidly recover after a disturbance of any kind and from any source to an acceptable level of service." Lieutenant Colonel Andrea Console, "Space Resilience – Why and How?" *The Journal of Joint Air Power Competence Centre, 27,* Autumn/Winter 2018, 13, https://www.japcc.org/wp-content/uploads/JAPCC_J27_screen.pdf.
[20] European Commission, *Space Strategy for Europe,* October 26, 2016, 8, https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/COM-2016-705-F1-EN-MAIN.PDF
[21] Lieutenant Colonel Andrea Console, "Space Resilience – Why and How?" 49.

and NATO capabilities. This has the added effect of increasing resiliency not only for these organizations but the rest of their members.

Closer integration between EU, NATO, and member-states may be perceived as an additional threat to Russia's interests. NATO and EU's space resiliency and improved space situational awareness will put Russia's military and space capabilities at a disadvantage. Most importantly, a closer EU and NATO space coordination will serve as a blow to Russian prestige. Already, Russia perceives NATO and EU encroachment upon its sphere of influence in eastern Europe as a threat to Russian power. Russia could feel alienated and threatened by NATO's enlargement in the space domain, further pushing Russia to develop and deploy counterspace assets and escalating competition with NATO.

CONCLUSION

NATO's primary goal with designating space as an operational domain is to focus and streamline the activities of the alliance in space. This is because space has become contested and congested due to the proliferation of space technology in recent years. Furthermore, the expansion of access in space opened new doors for commercial and civil use, thus transforming space into a global common. As such, space has become integral to both civil use and military operations.

Russia's equities in space eclipse the traditional and practical uses that NATO and its allies demand on space. For Russia, space is a domain of influence in which it can project its greatness and position as a world power. Russia recognizes the importance of space for both its own military and foreign adversaries, such US and NATO. For this

reason, Russia continues to expend resources to bolster its counterspace capabilities to deter US and NATO.

Based on these observations, the relationship between NATO and Russia will most likely be characterized by competition in order to deter each other's effective military use of space. The outdated OST, the explosion of assets in space through commercialization, and the divergent interests of space between NATO and Russia increase the insecurity of space. As presented above, Russia is capable of inflicting harm to space operations in multiple domains. Its demonstrated capabilities throughout the counterspace continuum reveals that Russia already possesses a competitive edge in space relative to NATO.

In turn, NATO will need to develop robust and resilient space operations to counter and deter Russian activities. The primary defense of NATO against Russian aggression in space and its related domain is the strength of its alliance. Pulling resources together and developing capabilities which are standardized and interoperable will generate resiliency for NATO space operations. In addition, it is imperative for NATO to leverage its partnership with EU to enhance its deterrence against Russian counterspace capabilities. The EU SST is a good starting point for collaboration because it focuses on shared interest in freedom of access and security in space operations. In the near term, NATO will have to rely on member-nations to defend and secure its interests in space. Therefore, NATO will need to act expeditiously and deliberately in order to ensure and secure its access in space.

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