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**OPERATING IN A VACUUM: SHAPING INTERNATIONAL NORMS IN THE
CONTESTED SPACE DOMAIN**

by

Nicholas S. Collier
Commander, US Navy

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CONTESTED SPACE DOMAIN**

by
Nicholas S. Collier
Commander, US Navy

A paper submitted to the Faculty of the Joint Advanced Warfighting School in partial satisfaction of the requirements of a Master of Science Degree in Joint Campaign Planning and Strategy. The contents of this paper reflect my own personal views and are not necessarily endorsed by the Joint Forces Staff College or the Department of Defense.

This paper is entirely my own work except as documented in footnotes.

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Abstract

Absent legal or normative structures to dictate military action in, from, and to the space domain, such conduct will be governed solely by power calculations (realism), which will put the United States at a distinct disadvantage as the primary user of the space domain. To achieve US stated space domain ends, space defense strategy should be approached using all instruments of national power. This study begins by examining the space operating environment, existing international law, and the current space policy and strategy. As the domain most analogous to the maritime environment, space strategy should build on the international norms surrounding the Law of the Sea. The evolving Arctic security environment further demonstrates an approach to shaping international norms within a contested region, offering parallels for policy and strategy to shaping the space global common. Finally, to reinforce the US space defense strategy, a multidomain space deterrence strategy is presented to shape behavior. The three deterrence measures of encouraging restraint, denying benefit, and imposing costs are examined in the context of space operations across the competition continuum.

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Dedication

To my wife, thank you for all your support on Earth.

For my kids, continue to reach for the stars.

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CHAPTER 1: INTRODUCTION

“Today, we are entering into a defining period for this country in space. We have an expansive spirit of exploration and experimentation. Our nation is strongest when space is secure and stable, accessible to enterprising Americans, and economic and scientific pursuits. But we are on the cusp of a tectonic shift in warfare. Access to space can no longer be assumed. It must be underpinned by strength. And if deterrence fails, I am convinced that the next major conflict with a peer competitor will be won or lost in space.”

Gen John W. Raymond
Space Force Chief of Space Operations¹

In July 2020, the Russian satellite Kosmos 2543 launched a projectile-like object, signaling the first operational test of a Russian offensive satellite-to-satellite weapon for use in the space domain.² Previous Anti-Satellite tests by China and, more recently, India have also demonstrated that the future of orbital space is at risk of becoming perpetually unusable due to orbital debris. As nations increasingly fear being left behind in the weaponization of space, international norms of behavior have not developed to keep pace with the increasingly contested environment. The resulting laissez-faire security environment and the need to protect critical space infrastructure drives spacefaring nations into a competitive dual-use arms race where defensive realism pervades and any new capability is countered to preserve the domain’s maneuver space.

The primary legal construct that governs space is the United Nations Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space. The Outer Space Treaty is largely silent on the weaponization of space. It only explicitly banned nuclear weapons and weapons of mass destruction from being placed in orbit, allowing nuclear-equipped

¹ John W. Raymond, “CSO Gen. Raymond’s Keynote from AFA’s VASC 2020,” *Air Force Magazine*, October 5, 2020, accessed November 9, 2020, <https://www.airforcemag.com/watch-read-cso-gen-raymonds-keynote-from-afas-vasc-2020/>.

² “An Arms Race Is Brewing in Orbit,” *The Economist*, August 15, 2020, accessed November 2, 2020, <https://www.economist.com/science-and-technology/2020/08/15/an-arms-race-is-brewing-in-orbit>.

Intercontinental Ballistic Missiles (ICBMs) to traverse suborbital space. The remaining Articles of the treaty are mostly aspirational declarations for the responsible use of space “in the interest of maintaining international peace and security and promoting international cooperation and understanding.”³

At the same time, the United States has developed the most significant military space architecture to support worldwide operations. While this superior capability allows for battlefield domination on the terrestrial battlefield, the US’s extensive use of space assets relative to our competitors creates an asymmetric vulnerability to counterspace attacks. Additionally, the US’s extensive reliance on the space domain for Early Warning, Intelligence, Surveillance, and Reconnaissance (ISR), and Command and Control (C2),⁴ gives competitors the first-mover advantage for offensive counterspace activity. If competitors gain the first-mover advantage, policymakers and strategists must ask two critical questions: One, in a contested environment where very limited international law applies, how should the US drive the creation of a comprehensive set of international norms of behavior in the Space Domain? Two, how should the nation use the elements of national power to deter actions unfavorable to our desired conditions for freedom of action in space across the competition continuum?

The US government must show consistency in action concerning acceptable space behavior and align those actions with its strategic principles in preserving the rules-based order in the global commons. In a speech to the Munich Security Conference, President Biden highlighted these shared democratic values saying, “Our partnerships have endured and grown

³ U.N. General Assembly resolution 2222, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, United Nations (1966).

⁴ Joint Publication 3-14, *Joint Doctrine for Space Operations* (10 April 2018), II-6.

through the years because they are rooted in the richness of our shared democratic values... built on a vision of a future where every voice matters, where the rights of all are protected and the rule of law is upheld.”⁵ As world governments continue to interact both cooperatively and competitively in emerging fields such as space, cyberspace, and artificial intelligence, the network of alliances and partnerships built to preserve the post war order will be the greatest asset in shaping acceptable norms of behavior.

With space becoming more congested and contested, framing the desired conditions in space is the logical starting point for developing norms. The 2020 Defense Space Strategy states the end state as desired conditions:

The space domain is secure, stable, and accessible. The use of space by the United States and our allies and partners is underpinned by sustained, comprehensive US military strength. The United States is able to leverage our use of space to generate, project, and employ power across all domains throughout the spectrum of conflict.”⁶

Absent legal or normative structures to constrain military action in, from, and to the space domain, such conduct will be driven solely by realism, which will put the United States at a distinct disadvantage as the primary user of the space domain. Because the United States Government (USG) desired end-state reflects space not simply as a domain in which freedom of action is not constrained but that this freedom can be denied to an adversary during conflict, the adaptation of maritime strategic principles can guide and shape international norms in space. To achieve the nation’s desired space domain conditions, US space defense strategy should build on

⁵ “Remarks by President Biden at the 2021 Virtual Munich Security Conference,” *The White House*, last modified February 19, 2021, accessed March 10, 2021, <https://www.whitehouse.gov/briefing-room/speeches-remarks/2021/02/19/remarks-by-president-biden-at-the-2021-virtual-munich-security-conference/>.

⁶ U.S. Department of Defense, *Defense Space Strategy Summary*, June 2020, 2.

the Law of the Sea and the evolving Arctic security environment to provide a framework for a multidomain space deterrence strategy across all elements of national power.

Methodology

This study examines policy, strategy, and operations in the current space environment and compares it to United States' policy and activities surrounding the Law of the Sea. There are several parallels between the international maritime domain and the space domain, where principled realism and deterrence precedes international norms and international law. The emerging Arctic security environment activity is then further explored to provide an even more suitable framework. With the recent and ongoing changes to polar ice, the Arctic has become a new frontier for exposing the gaps in established international law and, therefore, provides a relevant template for shaping norms in the contested space domain. In contrast to the Space domain, the United States has limited equities in the Arctic compared to some competitors, but US military and economic activity in the region reflect a more expansive view of the Arctic region beyond limited regional interests.

Using the developing Arctic security framework, the study then examines deterrence theory and activities required to maintain the desired conditions in space. These conditions, sustained through deterrence in the diplomatic, informational, military, and economic (DIME) dimensions of national power, will ensure that the US maintains the freedom of action in space necessary to support global commitments. Additionally, by reinforcing acceptable behavior in space and building bilateral and multilateral partnerships, alliances, and agreements, the United States can drive the development of formalized international norms that support the desired conditions in space. Finally, because the United States gains an asymmetric advantage with its

reliance on space-based assets, this deterrence must be comprehensive, multidomain, and cross-component.⁷

Thesis Overview

Chapter Two of this paper will examine the current operating and policy environment surrounding military and commercial activity in space. With new threats emerging in, from, and to the space domain, strategists are faced with a quickly shifting space environment where a competitor could deny freedom of action when. Additionally, the nature of the space domain presents several unique challenges. Kinetic action executed on orbit can permanently degrade or deny the use of orbital space by creating space debris that puts both commercial and military assets at risk. Non-kinetic actions may be difficult to detect and even more difficult to attribute to a specific actor without compromising space-based capabilities. This thesis then explores the limited international law and multilateral institutions for space activity, and how US Space policy and strategy has developed to direct operations in an increasingly congested environment.

Chapter Three discusses the evolution of the Law of the Sea from customary law to formal United Nations convention and the strategic lessons provided for shaping international norms of behavior in space. The United States also remains one of the few nations yet to sign the United Nations Convention on Law of the Sea (UNCLOS). The legal justification for not becoming a signatory coupled with a policy that upholds UNCLOS is instructive for a space strategy. The Arctic emergence as a new strategic environment for contesting international norms is examined in even greater detail. The Arctic case study will focus on military activity,

⁷ James P. Finch and Shawn Steene, "Finding Space in Deterrence: Toward a General Framework for 'Space Deterrence,'" *Strategic Studies Quarterly* 5, no. 4 (Winter 2011): 12.

economic developments, bilateral engagements, and multilateral partner building within the context of a comprehensive Arctic strategy as an analogy to space as a contested domain.

Chapter Four applies the maritime strategic principles to the space domain to develop a deterrence strategy for shaping space norms of behavior. Building on general deterrence elements of encouraging restraint, denying benefit, and imposing cost, it is important to evaluate flexible deterrence strategies for the space domain. Finally, this study concludes by examining the deterrence strategy across the competition continuum.⁸

⁸ Joint Doctrine Note 1-19, *Competition Continuum*, 3 Jun 2019.

CHAPTER 2: CURRENT SPACE OPERATING ENVIRONMENT

“CENTRAL PROBLEM: The US defense space enterprise was not built for the current strategic environment. The intentions and advancements of potential adversaries in space are threatening the ability of the United States to deter aggression, to protect US national interests, and to fight and win future conflicts.”

2020 Defense Space Strategy

Emerging Threats in the Space Domain

The weaponization of space began in the immediate aftermath of the Sputnik and Explorer satellites’ launch leading to the Cold War powers’ possession of both a capability and vulnerability to exploit. In 1959, the United States developed and tested air-launched ballistic missiles that would rely on a nuclear detonation in proximity to an enemy satellite as part of the Weapons System 199 program.¹ The Soviets countered by developing on-orbit anti-satellite (ASAT) systems that would lie in wait until activated to destroy a satellite with an explosive charge. This capability extended the arms race into the space domain, where each new offensive capability matched a comparable offensive capability as well as a defensive counterspace system. When the Soviets developed the Fractional Orbital Bombardment System that would use a satellite system to launch multiple independent nuclear weapons, the United States countered by developing the direct-ascent Anti-Satellite Zeus B rocket and ASM-135 air-launched ASAT missile. The following decades would prompt the further development of Soviet on-orbit weapons and their own air-launched ASAT missile, the Kontakt, and ground-based laser systems for destroying satellite optical systems.² As these weapons evolved, so too did the number of

¹ Guy Martin, “Anti-Satellite Weapons Driving the Militarisation of Space,” *Asia-Pacific Defence Reporter* 45, no. 6 (August 7, 2019): 41.

² Martin, 42.

tests and resulting debris fields, with 8 satellite intercepts and over 800 pieces of debris created in the 1980s.³

The space weaponization race temporarily culminated in 1986 when the United States successfully intercepted a delta rocket in low earth orbit to demonstrate a new Ballistic Missile Defense (BMD) capability as part of the Strategic Defense Initiative (SDI).⁴ The rapidly declining financial situation in the Soviet Union combined with this BMD demonstration heralded in a suspension of counterspace proliferation and testing, and with the collapse of the Soviet Union, the race to weaponize space was on hiatus until after the turn of the century. In 2001, following the 9/11 terrorist attacks, the United States withdrew from the Anti-Ballistic Missile (ABM) Treaty to once again pursue a global missile defense capability that would require missile intercepts in space.⁵ This not only ended the space détente between the United States and the Soviet Union, but created a power gap between the superpowers and other spacefaring nations.

In 2007, China tested its first direct ascent ASAT weapon, destroying one of its inactive satellites and creating a debris field of over 3,400 trackable pieces, of which half remain in orbit today.⁶ The Chinese developed the anti-satellite test to coerce the United States into signing the Russia-China sponsored Prevention of Arms Race in Outer Space (PAROS) Treaty, however, it had the opposite effect and encouraged other nations to begin developing counterspace

³ Martin, 41.

⁴ Martin, 40.

⁵ Edward Ifft, “The Demise of the ABM Treaty: An Insider Recounts the Final Days,” *Arms Control Today* 49, no. 9 (November 2019): 22.

⁶ Carin Zississ, “China’s Anti-Satellite Test,” *Council on Foreign Relations* (February 22, 2007), accessed October 29, 2020, <https://www.cfr.org/background/chinas-anti-satellite-test>.

capabilities to avoid being left behind.⁷ In 2019, India tested its first direct ascent ASAT weapon, this time creating a debris field that endangered the manned International Space Station (ISS).⁸ While these tests were both decried by the international community for the resulting debris-hazard, the development and proliferation of ASAT weapons was not been condemned as a violation of international law in space. This gives rise to both the imperative to provide defense for space-based systems and to pursue offensive space control weapons to hold adversary space assets at risk.

Non-kinetic threats are on the rise, as well. Electromagnetic jamming can severely degrade space-based capabilities at either the orbital platforms or the ground link stations.⁹ Numerous satellites used for Intelligence, Surveillance, and Reconnaissance (ISR) can have onboard optical sensors degraded through laser dazzling or jamming electromagnetic frequencies.¹⁰ Space-based infrared (IR) detection is critical to detecting ballistic missile launches, but the IR sensors could be vulnerable to infrared interference.¹¹ Cyberattacks can degrade or even deny critical communications nodes in space just as they can on terrestrial systems. Both cyber action and electromagnetic jamming present the added challenge of reducing attribution to an adversary, further complicating deterrence options. In some cases,

⁷ Fazal Abbas Awan and Umbreen Javaid, "Space Militarization Race among China-Russia and USA: Implications for South Asia," *South Asian Studies* (1026-678X) 35, no. 1 (January 2020): 89.

⁸ Ashley J. Tellis, "India's ASAT Test: An Incomplete Success," *Carnegie Endowment for International Peace* (April 15, 2019), accessed October 29, 2020, <https://carnegieendowment.org/2019/04/15/india-s-asat-test-incomplete-success-pub-78884>.

⁹ Joint Publication 3-14, *Joint Doctrine for Space Operations* (10 April 2018), I-6.

¹⁰ Joint Publication 3-14, I-7.

¹¹ Joint Publication 3-14, I-7.

even the ability to attribute such actions could compromise the presence of a space awareness or cyber monitoring capability.

The United States relies heavily on space assets to enable global operations relative to potential adversaries, creating an asymmetric first-mover advantage for competitor counterspace activities. As the commercial space sector continues to grow, space-based architectures' increased interdependency will create both opportunities and shared vulnerabilities. "The reemergence of great power competition and a rapid expansion of allied, partner, and commercial activities in space in recent years have drastically changed the character of the space domain."¹² Balancing the gained scientific and technology benefits with the increased threat of hostile action demands that norm shaping activity remains consistent with established norms in other domains and promotes restraint in space.

Space Law and International Norms

Despite the growing threat to a rapidly expanding space infrastructure, international law is surprisingly limited in applying legal limits to acceptable behavior in space, leaving most of the governance of space to vague international norms of behavior. An international norm is generally accepted as the "shared expectations of appropriate behavior," and there is a wide distinction in the space domain between normative *beliefs* and normative *behaviors* of various spacefaring nations.¹³ This lack of congruence between beliefs and actual behaviors helps explain the dearth of legal devices that govern the space domain, effectively providing only a limited consensus-based legal framework for space activity.

¹²U.S. Department of Defense, *Defense Space Strategy Summary*, June 2020, 3.

¹³ Vaughn Shannon, "International Norms and Foreign Policy," in *Oxford Research Encyclopedia of Politics*, by Vaughn Shannon (Oxford University Press, 2017).

The legal frameworks that exist are inadequate and backed by institutions lacking authority, leading to a realist-based approach where the few and powerful spacefaring nations govern space activity. There is no single agreed upon definition of where space begins, although the Karman line of 100km is generally accepted in practice. Theodore von Karman originally posited the boundary between atmosphere and space as the altitude at which aeronautic forces no longer provide lift at speeds slower than orbital velocity.¹⁴ Karman originally calculated this value at 83.8km, but this was really a calculation for the upper limits of aeronautic forces; elliptical orbits can achieve slightly lower minimum altitudes of 80km.¹⁵ NASA and the US Air Force both adopted 50 miles (roughly 80km) for the boundary of space and the FAA awards astronaut badges to anybody who flies above this limit.¹⁶ However, Karman in collaboration with the leading aeronautic physicists of the mid 20th century realized that the transition between aeronautics and astronautics was not clear in the troposphere and that the altitude at which orbital physics could truly discount aeronautical drag was greater than 90km. Karman arbitrarily suggested 100km to indicate the boundary for space, and the Fédération Aéronautique Internationale (FAI), a Swiss-based astronautics standards organization, adopted this altitude as the standard for record-keeping, although even this altitude is under recent assault to be lowered to 80km.¹⁷

¹⁴ S. Sanz Fernandez Cordoba, “100km Altitude Boundary for Astronautics,” *Fédération Aéronautique Internationale*, last modified August 1, 2017, accessed April 14, 2021, <https://www.fai.org/page/icare-boundary>.

¹⁵ Loren Grush, “Why Defining the Boundary of Space May Be Crucial for the Future of Spaceflight,” *The Verge*, December 13, 2018, accessed April 14, 2021, <https://www.theverge.com/2018/12/13/18130973/space-karman-line-definition-boundary-atmosphere-astronauts>.

¹⁶ *Ibid.*

¹⁷ S. Sanz Fernandez Cordoba, “100km Altitude Boundary for Astronautics,” *Fédération Aéronautique Internationale*.

Outer Space Treaty

The Outer Space Treaty forms the basis for the limited international law for use and exploration of space but was primarily geared toward preventing an extension of the nuclear arms race between the United States and Soviet Union into space. The only clearly delineated restriction is in Article IV, directing that treaty parties shall not “place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction,”¹⁸ but does not prevent the weaponization of space. Additionally, all states maintain their inherent right of self-defense in space according to Article 51 of the United Nations Charter. While this seems intuitive, the international community has yet to establish what constitutes an attack in the space domain. While the kinetic destruction of a satellite would certainly qualify as an attack, the question of whether the use of reversible non-kinetic effects to degrade a nation’s critical space infrastructure is an attack is more nuanced.

Since the signing of the Outer Space Treaty, there have been four expansionary treaties, none of which have yet to be ratified by the United States although the USG does still adhere to the provisions of these expansions. Similar to the Law of the Sea examined in the next chapter, each of these four expansions are flawed in that the United States as the primary spacefaring nation surrenders the most sovereignty in exchange for the highest burden of enforcement.¹⁹ The first is the Rescue Agreement²⁰ that calls for the safe return of astronauts in distress but could

¹⁸ U.N. General Assembly resolution 2222, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, United Nations (1966).

¹⁹ Rachel Rogers, “The Sea of the Universe: How Maritime Law’s Limitation on Liability Gets It Right, and Why Space Law Should Follow by Example,” *Indiana Journal of Global Legal Studies* 26, no. 2 (July 2019): 745.

²⁰ U.N. General Assembly resolution 2345, *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*, 19 Dec 1967, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/rescueagreement.html>.

also call for the return of adversary spacecraft if it had traveled above the Karman line and was requested by the launching authority. This could apply to both manned spaceflight as well as unmanned satellites falling from orbit. Operating by the intent allows the USG to retain the ability to distinguish between civil use space vehicles and combatants. The second is the Space Liability Convention²¹ that would establish legal liability for space faring nations responsible for damages resulting from space activity, but the framework was flawed in that it would require adjudication and enforcement by the United Nations.²² The third is the Space Registration Convention²³ that is currently adhered to by all spacefaring nations and enforced through the mutual benefit of preventing orbital and electromagnetic conflicts. The final expansion is the Moon Agreement that failed to get approved by any spacefaring nation, leaving the expansion virtually irrelevant to international space law.²⁴ At the time it was proposed, the Moon Agreement represented²⁵ a fundamental conflict for any nation with lunar aspirations as it would limit resource activities required for further exploration and development of the lunar surface. In all, only 18 nations signed the Moon Agreement, none of which maintain an organic space launch capability.²⁵ The result of this unratified patchwork approach is an extremely limited international framework where responsible action has yet to be established, and bilateral and multilateral agreements are the primary approach for identifying shared interests in space.

²¹ U.N. General Assembly resolution 2777, *Convention on the International Liability for Damage Caused by Space Objects*, 1 Sep 1972, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introliability-convention.html>.

²² Rogers, 749.

²³ U.N. General Assembly resolution 3235, *Convention on Registration of Objects Launched into Outer Space*, 15 Sep 1976, https://www.unoosa.org/pdf/gares/ARES_29_3235E.pdf.

²⁴ U.N. General Assembly resolution 34/68, *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, 5 Dec 1979, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/intromoon-agreement.html>.

²⁵ Rogers, 749.

Artemis Accords

NASA's upcoming Artemis missions will return humans to the lunar surface for the first time in over 50 years presenting a unique policy opportunity. The Artemis Accords are a multilateral agreement between eight independent countries to reaffirm some of the lunar provisions of the Outer Space Treaty while also agreeing to a set of principles governing the space domain's joint use.²⁶ Some of the key provisions of the Accords are to reinforce the commitment to deconflicting operations, transparency, public registration for space vehicles, orbital debris mitigation, and the emergency assistance for personnel in distress in space.²⁷ Most of these provisions merely reinforce the Outer Space Treaty or its expansions that have not been ratified by the USG. In exchange, the United States agrees to share the scientific data and research collected over the course of the mission with all signatories of the accords. While the Artemis Accords create no additional international law, they provide a multilateral norm shaping construct for reinforcing acceptable space conduct. The US advantage of agreeing to conduct exploration missions within a multilateral agreement is that it can further model acceptable behavior across the spectrum of space operations.

US Space Policy and Strategy

During the Cold War, the US Space Policy's principal objective was to strengthen national security and promote cooperation to maintain "the freedom of space for all activities that

²⁶ National Aeronautics and Space Administration, *The Artemis Accords: Principles for the Cooperation in the Civil Exploration and use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes*, 13 Oct 2020.

²⁷ *Artemis Accords*, 2020.

enhance the security and welfare of all mankind.”²⁸ In the years following the Cold War, national space policy focused on cooperative exploration while maintaining “freedom of action in space and deny[ing] such freedom of action to adversaries.”²⁹ In the unipolar moment, the US maintained a *laissez faire* approach to space in the belief that space hegemony could no longer be challenged, but this began to shift in the early 21st century. While the 2006 National Space Strategy highlighted an awareness of the growing hazard of space debris coupled with an increasing reliance on space-based assets for both national security and commercial applications, it was the 2011 National Space Policy that marked a key shift in the understanding of the space domain:

Space, a domain that no nation owns but on which all rely, is becoming increasingly congested, contested, and competitive. These challenges, however, also present the United States with opportunities for leadership and partnership. Just as the United States helped promote space security in the 20th century, we will build on this foundation to embrace the opportunities and address the challenges of this century.³⁰

This growing understanding of US asymmetric reliance on the space domain and a renewed focus on Great Power Competition has led to an evolved approach to maintaining national interests in space. Building on the 2017 National Security Strategy, the 2020 National Space Policy stated that “the United States will continue to use space for national security activities, including for the exercise of the inherent right of self-defense. Unfettered access and

²⁸ U.S. President, *National Security Decision Directive 42, National Space Policy*, 1982, <https://www.hq.nasa.gov/office/pao/History/nsdd-42.html>.

²⁹ National Security Presidential Directive-49, *U.S. National Space Policy*, 2006, <https://fas.org/irp/offdocs/nspd/space.html>. 1996 *National Space Policy*, September 19, 1996, <https://www.usgs.gov/media/files/1996-national-space-policy>.

³⁰ U.S. Department of Defense, *National Security Space Strategy*, 2011, https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/2011_nationalsecurityspacestrategy.pdf.

freedom to operate in space is a vital national interest.”³¹ The Space Policy lays out eight distinct goals to be accomplished across the commercial, civil, and national security sectors and provides cross-sector guidelines for executing a unified approach. The primary national security goals for space are to “create a safe, stable, secure, and sustainable environment for space activities”³² and “increase the assurance of national critical functions.”³³ To achieve these goals, the United States must strengthen international cooperation across all human space enterprise elements. The key specified task for national security is to develop “strategies, capabilities, and options to respond to any purposeful interference with or attack on the space systems of the United States or its allies.”³⁴

Building on this policy, the Department of Defense’s (DoD) 2020 *Defense Space Strategy* created four prioritized lines of effort (LOEs) to achieve the desired conditions for the space domain:

1. Build a comprehensive military advantage in space.
2. Integrate military space power into national, joint, and combined operations.
3. Shape the strategic environment.
4. Cooperate with allies, partners, industry, and other US Government departments and agencies.³⁵

These LOEs represent the operationalization of the space domain that aims to translate US normative beliefs into action, but they fall short in describing how they will nest with the

³¹ U.S. President, *National Space Policy of the United States of America*, 9 Dec 2020, 3.

³² *2020 National Space Policy*, 5.

³³ *Ibid*, 5.

³⁴ *Ibid*, 9.

³⁵ U.S. Department of Defense, *Defense Space Strategy Summary*, 2020, 6.

national space policy. The primary issue is LOE 3, “Shape the strategic environment,” which identifies deterrence as the primary goal and, “if deterrence fails, be capable of winning wars that extend into space.”³⁶ However, the specific objectives identified for each LOE of the *Defense Space Strategy* all primarily describe strategic communication and activities on the Information and Diplomatic instruments of national power without addressing the basic approach for establishing credible deterrence.³⁷ If the end state is a set of desired conditions for the space domain, then “shaping the strategic environment” is just a return to the original problem statement. While the other three LOE’s provide a credible approach for achieving the desired conditions, they are not unified in action. The main component missing from the DoD *Defense Space Strategy* is a line of operation (LOO) that describes the deterrence approach required to underpin a comprehensive multilateral and multidomain strategy.

Challenges

Space operations are inherently challenging for natural and man-made reasons, ranging from orbital debris to solar activity to astrophysics. Additionally, humanity has no real operational experience with conflict beginning in or extending into space, leaving virtually no common understanding of what constitutes acceptable military operations in space. *Joint Publication 3-14 Space Operations* provides initial doctrine for operations in space but is primarily limited to understanding the operating environment and protecting the current space architecture.³⁸ However, *JP 3-14* provides a definition for Space Control:

³⁶ *Ibid*, 8.

³⁷ *Ibid*, 7-9.

³⁸ Joint Publication 3-14, *Joint Doctrine for Space Operations* (Washington: Joint Chiefs of Staff, 10 April 2018).

Joint space forces conduct space control operations to ensure freedom of action in space for the United States and its allies and partners and, when directed, to deny an adversary freedom of action in space.³⁹

This definition for Space Control is aligned with Julian Corbett's concept of command of the sea as "nothing but the control of maritime communications."⁴⁰ This idea of maintaining friendly freedom of action and denying that to an adversary, has so many similarities with the US concept of Space Control, that exploring maritime strategic principles as a basis for space strategy is essential. Further, the norm shaping activity surrounding Law of the Sea can provide instructive lessons for developing a more comprehensive approach to preserving space as an enabling domain through deterrence.

³⁹ Joint Publication 3-14, I-4.

⁴⁰ Julian S. Corbett, *Principles of Maritime Strategy* (New York: Dover Publications, 2004) [Reprint of 1911 Longmans, Green edition], 80.

CHAPTER 3: LAW OF THE SEA AND THE ARCTIC AS A FRAMEWORK

“Since the interests and activities of spacefaring nations are similar to those of seafaring nations of years past, it is presumed that space and maritime strategies will share similar principles also.”

John J. Klein
*Space Warfare: Strategy, Policy, and Principles*¹

The parallels between Law of the Sea and norms in space are readily apparent in the treatment of space beyond the Karman line in the same manner as the freedom to operate in international waters. However, just as in Law of the Sea, the application of norms in space must be balanced by states’ right to defend their critical interests in space. The Law of the Sea is a customary law established over centuries of sea-faring nations operating by and enforcing commonly accepted practices and later codified by the United Nations. While the United States has yet to sign the 1982 United Nations Convention on Law of the Sea (UNCLOS), it is a party to the 1958 Law of the Sea conventions, and all four treaties remain in effect for the United States.² The Law of the Sea applies to peacetime activities below the level of armed conflict and presents a common foundation to prevent miscalculation at sea. Furthermore, the United States accepts, operates by, and enforces UNCLOS except for the seabed mining provisions. However, the Law of the Sea has developed over centuries of norm-shaping activity and resulting legal frameworks to arrive at the current international standards. The accelerating melting of ice in the Arctic has created new challenges to the established international norms and the Law of the Sea.

¹ John J. Klein, *Space Warfare : Strategy, Principles and Policy*, Space Power and Politics (Hoboken: Routledge, 2012), 21.

² Ronald O’Rourke et al., “Changes in the Arctic: Background and Issues for Congress,” *Congressional Research Service: Report* (September 23, 2019): 17.

This newly contested maritime security environment provides an even more appropriate analogy for developing a norm-shaping strategy in the space domain.

United Nations Convention on Law of the Sea

The primary section of UNCLOS to be applied to the space domain would be section 7, governing the “High Seas,” or all parts of the sea that are not included in a nation's exclusive economic zone (EEZ), territorial sea, or the internal waters of a State.³ In these international waters, vessel operators are allowed a great deal of freedoms provided they are “exercised by all States with due regard for the interests of other States in their exercise of the freedom of the high seas.”⁴ With these freedoms comes a limited number of obligations for mariners that have relevant space-domain applications. Article 89 invalidates the claims of sovereignty over the high seas, in the same manner that space beyond the Karman line is considered international space. Article 90 provides that every state has the right to sail ships, implying that any state has the right to become a spacefaring nation. Articles 91 to 94 establish the right of “flag states” to provide for vessels’ authorization and operations under its flag, which are similar to provisions of the Space Registration Convention. These vessels maintain the right to operate without being interfered with by any nation other than the flag nation unless the vessel switches flags based on convenience, in which case they cannot claim any of the protections allowed by UNCLOS. In space, applying this same principle could prevent non-state commercial organizations from attempting to bypass the Registration Convention as the space asset in question could be theoretically seized or interfered with by any nation with the capability. Article 98 establishes the

³ UN General Assembly, *Convention on Law of the Sea*, 10 December 1982, Section 7.

⁴ UN General Assembly, *Convention on the Law of the Sea*, 10 December 1982, Article 87.

duty to render assistance which is already a norm in space in the form of the unratified Rescue Agreement.⁵

Articles 95 and 96 present the most critical points of consideration for applying Law of the Sea in the space domain. Under Articles 95 and 96, warships and government, non-commercial ships on the high seas “have complete immunity from the jurisdiction of any State other than the flag State.”⁶ The direct application of these Articles in space presents a dilemma in that many US space-based assets are commercially hosted, providing both government and commercial services. This provides for both economies of scale in pairing orbital capabilities into a single vehicle and helps to create a broader dispersal and resilience of the space infrastructure. Simultaneously, competitors can also use commercial hosting for the same purposes, and the public-private distinction may be less meaningful. From that standpoint, having a special distinction for “space warships” in addition to flag state could prove advantageous as deterrence for counterspace activities in that interference with a US flagged spaceship would clearly constitute a hostile act and space warships would be poised to respond.

Articles 100 through 107 all deal with piracy and will eventually become very applicable in the space domain as commercial entities continue to proliferate the number of orbital vehicles. Piracy is defined in Article 101 as any “illegal acts of violence or detention or any act of depredation, committed for private ends” and directed “against a ship, aircraft, persons or property in a place outside the jurisdiction of any State.”⁷ While a direct application of this definition in space would constrain a commercial operator of another state from using space-

⁵ UN General Assembly, *Convention on the Law of the Sea*, 10 December 1982, Article 98.

⁶ UN General Assembly, *Convention on the Law of the Sea*, 10 December 1982, Article 95, 96.

⁷ UN General Assembly, *Convention on the Law of the Sea*, 10 December 1982, Article 101.

based capabilities to profit from acts of violence or depredation such as denial of service for ransom or destruction of property, it could place limits on the use of commercially hosted payloads. While passive activities such as Early Warning (EW) and Intelligence, Surveillance, and Reconnaissance (ISR) could continue on hosted commercial satellites, counter-space activities that deny an adversary use of their own space architecture could ostensibly create a fleet of privateering spacecraft. Articles 105 and 107, any state may use a warship or military aircraft to seize a ship or aircraft under pirates' control.⁸ In space, this analogy would give any state authority to "seize" such a ship or perhaps use a non-kinetic effect to prevent piracy. Accepting some restrictions in commercially hosted activities and the designation of space warships ultimately provides more freedom of action for the military space vehicles and attribution of unacceptable space behavior. In order to best shape norms, consistency in application of these conventions across domains is paramount.

US Sovereignty and UNCLOS

The United Nations Convention on Law of the Sea (UNCLOS) was intended to firmly codify the customary Law of the Sea under the aegis of the United Nations. Still, President Reagan determined that several UNCLOS provisions would deprive the United States of sovereignty, and he would not sign the treaty. The primary issue was the jurisdiction over seabed mineral rights outside of the 200 nautical mile Economic Exclusion Zone (EEZ). Under Articles 76 and 77 of UNCLOS, a State can establish EEZ resource claims beyond 200 nautical miles based of the continental shelf, or the "natural prolongation of its land territory to the outer edge

⁸ UN General Assembly, *Convention on the Law of the Sea*, 10 December 1982, Article 106.

of the continental margin.”⁹ A Coastal State can establish these rights by submitting geological survey data to the Commission on the Limits of the Continental Shelf and effectively extend their exclusive right to fisheries, seabed minerals, energy production, and exploration.¹⁰ Additionally, mining of minerals outside of the EEZ and not subject to continental shelf claims were to be used for the “benefit of mankind as a whole,”¹¹ and administered by the International Seabed Authority (ISA), which would have the authority to levy a tax upon commercial activities to benefit developing countries that could not access the deep sea bed. John O’Sullivan examined these challenges in his *National Review* article “Lost is Right,” identifying the conflict of interest as “nations and companies that engage in commercial mining must subsidize their rivals and competitors.”¹² The United States signed the 1994 Agreement that accedes to the provisions of UNCLOS with the exception of the seabed mining provisions, becoming a “provisional applicant,” but the treaty has yet to achieve Congressional ratification.

While this loss of revenue and commercial autonomy was problematic, the more pressing concern was a transfer of maritime sovereignty to the International Tribunal for the Law of the Sea (ITLOS). The ITLOS could have negative impacts on US Maritime security in both offensive and defensive capacities. If the US Navy conducted interdiction operations in support of either unilateral or multilateral sanctions outside of a UN Security Council Resolution, as a signatory to UNCLOS, the United States could face adjudication by the ITLOS. If a US vessel were to be seized by an aggressor with a claim that it had violated territorial waters, the ITLOS would again assert authority to render justice. This regime creates a system where the ISA and

⁹ UN General Assembly, *Convention on the Law of the Sea*, 10 December 1982, Article 76.

¹⁰ UN General Assembly, *Convention on the Law of the Sea*, 10 December 1982, Article 76, 77.

¹¹ UN General Assembly, *Convention on the Law of the Sea*, 10 December 1982, Article 140.

¹² John O’Sullivan, “LOST Is Right,” *National Review* 59, no. 16 (September 10, 2007): 24.

ITLOS are accountable only to each other and would equally rely on the US Navy as the primary guarantor of UNCLOS. O’Sullivan likened this arrangement to other disadvantageous international agreements, saying, “Sure, we’ll find it more difficult to protect our maritime rights under UNCLOS, and of course, it will hinder our exploitation of seabed mining, but in return we’ll get loss of sovereignty.”¹³ Naval superiority may not be the primary reason for not signing, but rather the ceding of sovereignty over the fleet to reinforce international norms that may not favor national interests. The same holds in the space domain and is instructive in understanding why the United States did not sign the Outer Space Treaty expansions and cede some space autonomy to the United Nations. Just as with UNCLOS, the American space enterprise would simultaneously be the most vulnerable to hostile counterspace activity while also being the only force capable of enforcing them.

The United States enforces the customary Law of the Sea, even as it remains in abstention of UNCLOS, and conducts a whole-of-government approach across the instruments of national power to shape and reinforce the Law of the Sea norms. The strategic approach for this is to conduct Freedom of Navigation Operations (FONOPS) that challenge claims that exceed Law of the Sea and the same approach could be used in space. China’s claims of extended sovereignty over much of the South China Sea (SCS) in asserting their “9-dash line” policy infringe on neighboring states and generally challenges the entire rules-based international order.¹⁴ To counter this, the United States routinely sails warships and carrier strike groups through these waters, openly communicating intentions to the global community to reinforce US

¹³ O’Sullivan, 24.

¹⁴ Denny Roy, *Return of the Dragon: Rising China and Regional Security* (New York: Columbia University Press, 2013), 224.

commitment to international law.¹⁵ Additionally, the US Coast Guard conducts several security cooperation activities with our partners to maintain freedom of access in both the SCS and East China Sea (ECS) EEZ for fishing and resource mining activities. Finally, the DoD executes bilateral and multilateral exercises within the region with allies and partners that demonstrate force projection capabilities within the entire region and challenge Chinese Air Defense Identification Zones (ADIZ) that extend past territorial airspace in the ECS and SCS.¹⁶ These activities all serve as a deterrent by denying the perceived benefits of the 9-dash line policy. In space, the same multilateral approach to countering hostile activity in space must be clearly communicated with proper attribution.

International Norms in the Arctic

With climate change accelerating the summer ice melt in the Arctic, the access to new shipping passages and seabed resources has created a new arena for contesting the established Law of the Sea. Additionally, technological advancements in a resource-scarce environment have increased the competition for seabed minerals and prompted expanding claims to continental shelf features beneath the Arctic ocean. This competitive security environment proves especially instructive for space policy and strategy development, as the small number of Arctic states attempt to shape norms in this contested environment.

¹⁵ Benjamin K. Wagner, “Lessons from Lassen: Plotting a Proper Course for Freedom of Navigation Operations in the South China Sea,” *Journal of East Asia & International Law* 9, no. 1 (January 2016): 142.

¹⁶ Michael R. Gordon, “For Wars of the Future, Pentagon Looks to Distant Past: The B-52,” *Wall Street Journal*, January 24, 2021.



Figure 1: Map of the Arctic Circle¹⁷

The North Sea Route extends from the Bering Strait between Russia and the United States through the Arctic Ocean north of mainland Russia to the Barents Sea off the northern coast of Norway, providing a northern route from East Asia to Europe (*Figure 1*). While ships can transit the North Sea Route through named international straits and in international waters and during the summer, Russia claims some of the waters as internal and requires other nations

¹⁷ Thomas Omestad Staff Writer • Oct. 9, 2008, and At 11:00 A.m, "Global Warming Triggers an International Race for the Arctic," *US News & World Report*, accessed February 16, 2021, <https://www.usnews.com/news/world/articles/2008/10/09/global-warming-triggers-an-international-race-for-the-artic>.

to request permission to use the passage with Russian navigation pilots aboard.¹⁸ China is especially interested in using the North Sea Route as part of their “Belt and Road Initiative,” creating an “Ice Silk Road” connected to Europe as an alternative to the southern shipping route through the Straits of Malacca and the Suez Canal.¹⁹ The route is a shorter overall distance to ports in northern Europe and avoids the financial and strategic issues of transiting the Suez canal with Egyptian pilots, security, and fees. The agreement to Russian transit requirements further normalizes behavior that is inconsistent with the Law of the Sea.

On the other edge of the Arctic Ocean, the Northwest Passage (NWP) that connects the Atlantic to the Pacific via waterways through Canadian archipelagic waters is also problematic (*Figure 1*). With the ice melted, these waterways meet the Law of the Sea definition for straits used for international navigation between one part of the high seas and another.²⁰ However, Canada claims that the NWP is comprised of internal waters and is therefore subject to Canadian sovereignty. The United States refutes this claim to maintain normative behavior consistency across the region even though the Canada remains a close US ally and US-Canadian interests largely overlap in the Arctic.

Compounding the melting ice problem is an opportunity for increased access to natural resources aided by emerging offshore technology developments. This opportunity is matched with increasing claims of sovereignty that challenge the Law of the Sea or have not been enforced in practice. Russia has made a new claim to the Lomonosov Ridge, conducting

¹⁸ Ronald O’Rourke et al., “Changes in the Arctic: Background and Issues for Congress,” *Congressional Research Service: Report* (September 23, 2019): 32.

¹⁹ Ronald O’Rourke et al., “Changes in the Arctic: Background and Issues for Congress,” *Congressional Research Service: Report* (September 23, 2019): 36.

²⁰ UN General Assembly, *Convention on the Law of the Sea*, 10 December 1982, Article 37.

numerous underwater geological surveys to establish it as an extension of Russia's continental shelf.²¹ The ridge traverses nearly the entire expanse of the Arctic Ocean between Russia and Canada passing beneath the North Pole (Figure 2).

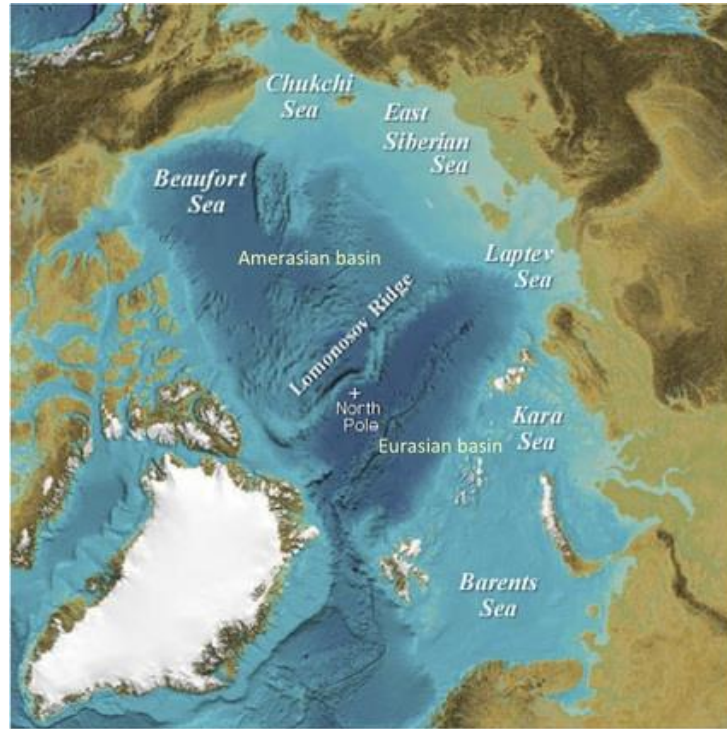


Figure 2: Map of Lomonosov Ridge²²

Canada and Denmark have also laid claims to portions of the ridge, and it is not entirely clear that the ridge meets UNCLOS's definition for a continental shelf.²³ While the United States as an arctic nation could benefit from also challenging continental shelf limits in the Beaufort Sea north of Alaska, the consistent enforcement of the Law of the Sea and multilateral engagement in the Arctic is key to sustaining our global interests. Proponents of establishing a

²¹ Jessa Gamble, "Arctic Landgrab," *Scientific American Special Edition* 19, no. 1 (2009): 60.

²² "Lomonosov Ridge," *The Right Arctic*, accessed February 16, 2021, <http://arcticcontroversy.weebly.com/lomonosov-ridge.html>.

²³ Gamble, 61.

separate legal regime for Arctic waters or the sea's designation above a certain parallel as a "wilderness area" similar to the framework of the Antarctic Treaty fail to account for the negative impact for policy in other regions and domains.²⁴ In effect, any exceptional legal designation given to the Arctic could encourage further contesting of norms in other regions to prompt similar legal exceptions. This is especially true of China's excessive claims in the South China Sea based on dubious claims to the continental shelf and Spratly Islands. Accepting behavior that is not consistent with the multilateral, rules-based framework risks normalizing behavior that counters our interests in other regions or other domains such as air and space.

US Arctic Strategy

The US Arctic strategy is linked to a broader multidomain strategy for shaping international norms, especially in evaluating how policy objectives are supported by strategy. The *DoD Arctic Strategy* states that "DoD's desired end-state for the Arctic is a secure and stable region where US national interests are safeguarded, the US homeland is defended, and nations work cooperatively to address shared challenges."²⁵ To achieve these ends, the *Strategy* identified three ways to reach this desired end-state: "building Arctic awareness, enhancing Arctic operations, and strengthening the rules-based order in the Arctic."²⁶ The resulting lines of effort support not only the desired end-state for the Arctic region but also reinforce the multilateral rules-based construct throughout the world. Maintaining this consistency in strategic principles across regions translates to a consistency that can be applied across domains and into space. With the United States's asymmetric interests in space, it is even more critical to maintain

²⁴ Ronald O'Rourke et al., "Changes in the Arctic: Background and Issues for Congress," *Congressional Research Service: Report* (September 23, 2019): 21.

²⁵ *Department of Defense Arctic Strategy*, Report to Congress, June 2019, 2.

²⁶ *Department of Defense Arctic Strategy*, Report to Congress, June 2019, 2.

freedom of action during competition and the ability to deny the freedom of action of an adversary in conflict.

Building arctic awareness is key to countering malign behavior such as extending EEZ activities or enforcing excessive Air Defense Identification Zones (ADIZ) and has broader intersections with and analogies for US space strategy. The Arctic region's size is characterized by extreme environmental conditions that make forward basing of radar sensors and maritime navigation difficult. While submarines have traditionally been the primary naval asset operating beneath the polar ice, their ability to contribute to the surface maritime picture while submerged is limited. Satellite monitoring of the arctic region is also difficult since the more polar the latitude, the less effective low earth orbit (LEO) satellites will be for both dwell time and viewing angle, requiring highly elliptical orbits (HEO) to maximize coverage of the region.²⁷ To achieve better arctic awareness and improve the ability to attribute negative behavior in a timely fashion, the United States is engaged in three primary lines of effort (LOE). First is the modernization of the U.S.-Canadian North American Aerospace Defense Command (NORAD) integrated air and missile defense sensor architecture to provide early warning and tracking for air and missile threats in the Arctic.²⁸ Second, the DoD is enhancing maritime patrols in the Greenland Iceland United Kingdom (GIUK) gap, using P-8 aircraft patrols to monitor naval activity and shipping bound for Europe or the North American east coast via the North Sea Route (NSR).²⁹ The third LOE is to improve C4ISR in the challenging arctic environment.

²⁷ Alexander P. Trishchenko, Louis Garand, and Larisa D. Trichtchenko, "Observing Polar Regions from Space: Comparison between Highly Elliptical Orbit and Medium Earth Orbit Constellations," *Journal of Atmospheric & Oceanic Technology* 36, no. 8 (August 2019): 1605–1621.

²⁸ U.S. Department of Defense, *Department of Defense Arctic Strategy*, Report to Congress, June 2019, 9.

²⁹ U.S. Department of Defense, *Department of Defense Arctic Strategy*, Report to Congress, June 2019, 9.

Communications north of 65 degrees in latitude face solar and magnetic interference that “requires establishing robust and dynamic communications architecture with terrestrial, aerial, and space layers that are fully integrated and interoperable with mission partners.”³⁰

Perhaps the most essential strategic way identified in the US Arctic strategy is enhancing arctic operations because it models behavior consistent with US normative beliefs and reinforces the normative behaviors that are consistent with the desired Arctic end-state. While the DoD has maintained Alaskan Command (ALCOM) as a subordinate unified command since 1947, the command structure and reporting relationships have been fluid and typically lacking unity of command, especially between the air and sea domains. ALCOM maintained responsibility for homeland air defense as part of the Alaskan NORAD region, while the defense of the Aleutian island chain and surrounding waters fell under USPACOM command. Even after the establishment of USNORTHCOM following the 9/11 terrorist attacks, the reestablished Joint Task Force Alaska (JTF-AK) still did not have a maritime defense authority. It would not be until 2014 that ALCOM gained maritime defense as a mission and was fully aligned under USNORTHCOM.³¹ The US Navy reestablished the 2nd Fleet in May 2018 to counter Russian activity in the North Atlantic but was given the authority of the Arctic and became the Joint Force Maritime Component Commander (JFMCC) for USNORTHCOM. This created unity of command for the entire Arctic region led to a revitalized operational focus for defending the homeland.

³⁰ U.S. Department of Defense *Department of Defense Arctic Strategy*, Report to Congress, June 2019, 10.

³¹ “Joint Base Elmendorf-Richardson > Units > Alaskan Command,” accessed February 15, 2021, <https://www.jber.jb.mil/Units/Alaskan-Command/>.

However, the most critical aspect for enhancing *operations* is enhancing the *access* to previously unreachable waters, which informs space strategy in maintaining orbital access. As the lead agency responsible for ice-breaking operations in the arctic, the US Coast Guard is actively working on expanding from 3 legacy icebreakers to a fleet of 6 polar icebreakers.³² Having the ability to operate in more waterways allows Corbett’s “fleet in being”³³ concept to apply in the Arctic, where the ability to access more waterways allows surface warships the ability to serve as a deterrent, even when they are not actively operating in the region. The Air Force has also shifted focus to operating in the high north, utilizing Alaska bases to conduct long-range bomber training missions north of the Arctic circle.³⁴ This increased access to the Arctic region improves situational awareness and competitor activity that runs subversive to the rules-based international order.

To reinforce this updated force posture and demonstrate a credible capability to counter malign activity in the Arctic, the US has led a series of bilateral and multilateral exercises, wargames, and freedom of navigation demonstrations. The biennial ARCTIC EDGE exercise allows deployment of mobilization and deployment in the arctic environment, while the annual VIGILANT SHIELD globally integrated exercise allows NORAD to exercise its combined U.S.-Canada command-and-control authorities in defense of the entire North American AOR. The TRIDENT JUNCTURE NATO exercise in 2018 was conducted in the Norwegian Sea north of

³² “Q&A: Adm. Karl L. Schultz, Commandant of the U.S. Coast Guard,” *Sea Power* 63, no. 6 (August 7, 2020): 26.

³³ Julian S. Corbett, *Principles of Maritime Strategy* (New York: Dover Publications, 2004) [Reprint of 1911 Longmans, Green edition], 80.

³⁴ Secretary Heather Wilson and Gen David Goldfein, “Air Power and the Arctic: The Importance of Projecting Strength in the North,” *Defense News*, January 9, 2019.

the GIUK gap and marked the first U.S. Carrier Strike Group sailing north of the Arctic Circle since 1991 under the operational command of the 2nd fleet.³⁵ With four Arctic Nations also members of NATO (US, Canada, Norway, Denmark), the role of NATO in an Arctic conflict has not been fully established. Further exercises will serve to form an allied concept of operations (CONOPS) in the arctic as well as to generate strategic communication to deter potential aggressors.

Finally, strengthening the rules-based order is the primary way to secure US strategic ends in the arctic and reinforce consistent principles throughout all regions and all domains. The ability to translate increased awareness and enhanced operations into strengthening the rules-based environment requires multilateral engagement. The Arctic Council is the primary international forum for collaboration on Arctic issues by the eight Arctic states, which includes both the United States and Russia, with the goal of “promoting cooperation, coordination, and interaction among the Arctic states.”³⁶ Non-arctic states, intergovernmental, and non-governmental organizations are allowed to participate in the Council as observers, provided they recognize the Arctic States’ sovereign rights and jurisdiction under the extensive legal framework in the region, including the Law of the Sea. It is not a treaty organization and collaborates on a wide range of international interests in the region with the critical and intentional omission of military security.³⁷ However, China’s continued presence as an observer is predicated on an acceptance of maritime law that runs counter to their extensive claims in the

³⁵ Christopher Woody, “‘We Can Do Better’: The Navy’s Newest Fleet Commander Says US Ships and Sailors Got ‘Beat Up’ During NATO’s Biggest Exercise Since the Cold War,” Business Insider, December 4, 2018

³⁶ Arctic Council, *Ottawa Declaration*, 19 September 1996.

³⁷ *Ibid.*

South China Sea. “As one potential example of a cost-imposing action, US policymakers could consider moving to suspend China’s observer status on the Arctic Council as a punitive cost-imposing measure for unwanted Chinese actions in the South China Sea.”³⁸

Cooperation with allies and partners across the wide range of Arctic security, economic, and environmental concerns while preserving the freedom of the seas deters aggression by creating enhanced regional connectivity and shared normative beliefs. The Arctic Council Agreement on Arctic Search and Rescue (SAR) presents a forum where common interests generate consensus and cooperation that strengthen the rule-based order, with clear parallels to the UNOOSA Rescue Agreement. There are also immense opportunities for joint ventures to include public-private research partnerships and multinational exploration engagements both in the Arctic and in space. By ensuring access to the Arctic’s emerging opportunities while consistently enhancing the rules-based order, the mutual dependencies between all parties in the system serve as a powerful deterrent against taking meaningful action and serves as a fitting basis for promoting international norms in space.

³⁸ Ronald O’Rourke et al., “Changes in the Arctic: Background and Issues for Congress,” *Congressional Research Service: Report* (September 23, 2019): 37.

CHAPTER 4: APPLYING DETERRENCE TO THE SPACE DOMAIN

“Deterrence operations convince adversaries not to take actions that threaten US vital interests by means of decisive influence over their decision-making. Decisive influence is achieved by credibly threatening to deny benefits and/or impose costs, while encouraging restraint by convincing the actor that restraint will result in an acceptable outcome.”

*Deterrence Operations Joint Operating Concept*¹

Given the US’s asymmetrical reliance on space-based capabilities, counterspace deterrence will be most credible and effective if conducted in a multidomain environment across all elements of national power. The 2017 National Security Strategy states that “any harmful interference with or an attack upon critical components of our space architecture that directly affects this vital US interest will be met with a deliberate response at a time, place, manner, and domain of our choosing.”² However, in a domain lacking rules and norms, the ability to respond in space remains critical. Likewise, space can no longer be treated as merely an enabling domain for terrestrial conflict, as the first combat action in a future conflict may take place in space. Additionally, deterrence in the space domain must be considered across the competition continuum, from cooperation to competition to conflict.³ Therefore, the key to applying the Law of the Sea and the Arctic Security environment lessons and translating those principles to the space domain requires a comprehensive and multilateral approach that prioritizes shaping normative *behavior* as a precursor to normative *beliefs* that form the basis for future international law.

¹ U.S. Department of Defense, *Deterrence Operations Joint Operating Concept*, 2006, accessed November 12, 2020, https://www.jcs.mil/Portals/36/Documents/Doctrine/concepts/joc_deterrence.pdf?ver=2017-12-28-162015-337.

² U.S. President, *National Security Strategy*, 2017, 31.

³ Joint Doctrine Note 1-19, *Competition Continuum*, 3 Jun 2019.

While shaping the environment takes time, the critical lesson from the Arctic security environment is that modeling acceptable behavior is the primary means for shaping norms while deterring behaviors that counter desired norms across the domain. Space is inherently unconquerable and therefore command of space also follows Corbett's axiom for sea command: "You cannot conquer sea because it is not susceptible of ownership, at least outside territorial waters...the only positive value which the high seas have for national life is as a means of communication."⁴ Building on this idea of space as a collection of lines of communication simplifies the problem, maintaining freedom of action in space while having the ability to block space lines of communication of an adversary. The key to preserving this deterrence posture is possessing both credibility and capability to deny an adversary's actions while not actually implementing such measures. With the US asymmetric reliance on space systems for enabling global operations, a multidomain flexible deterrence posture for military space operations must be clearly communicated and consistent across the entire competition continuum.

⁴Julian S. Corbett, *Principles of Maritime Strategy* (New York: Dover Publications, 2004) [Reprint of 1911 Longmans, Green edition], 80.



Figure 3: Ends-Ways-Means Approach (Strategy)⁵

The *Deterrence Operations Joint Operating Concept (DO-JOC)* identifies three primary deterrence approaches: encourage restraint, deny benefits, or impose costs.⁶ Within each of these primary “ways,” a number of “means” can be used to deter aggressive behavior that runs counter to the United States’ “ends” of a stable, secure, accessible space domain (Figure 3).⁷ The *DO-JOC* also highlights that the critical enabler for all three approaches is global situational awareness, which reinforces the importance of Space Situation Awareness (SSA) as a critical requirement for space mission assurance. Finch and Steene translated traditional nuclear deterrence concepts to the space domain in 2011, recognizing three unique aspects that change the deterrence calculus across each of the three deterrence “ways.”⁸ The first is that space weapons do not pose an existential threat and therefore, may be viewed as simply another

⁵ U.S. Department of Defense, *Deterrence Operations Joint Operating Concept*, 2006, 20.

⁶ U.S. Department of Defense, *Deterrence Operations Joint Operating Concept*, 2006, 24. accessed November 12, 2020, https://www.jcs.mil/Portals/36/Documents/Doctrine/concepts/joc_deterrence.pdf?ver=2017-12-28-162015-337.

⁷ U.S. Department of Defense, *Deterrence Operations Joint Operating Concept*, 2006, 20.

⁸ James P. Finch and Shawn Steene, “Finding Space in Deterrence: Toward a General Framework for ‘Space Deterrence,’” *Strategic Studies Quarterly* 5, no. 4 (Winter 2011): 11.

weapon. The second is that space systems present an offensive advantage as it is much easier to hold a space system at risk than it is to defend them. Finally, counterspace weapons exist on a spectrum from non-kinetic to kinetic, reversible to non-reversible.⁹ Building on the concepts in the *DO-JOC* with the framework presented by Finch and Steene, the following sections evaluate an approach that leverages the lessons of the Law of the Sea and Arctic security environment to model normative behavior while encouraging restraint for hostile counterspace activities.

Encourage Restraint

While the first human endeavors in space extended the Cold War's military competition beyond the Earth's atmosphere, the space domain still enjoys a predominantly cooperative framework rooted in the shared drive for space exploration, scientific discovery, and improved terrestrial living. This collaborative drive has led to the formation of numerous multilateral organizations that provide the initial basis for normative behavior in space. The International Space Station (ISS) partners the five largest space agencies into a single ambitious endeavor dedicated to scientific discovery and provides a shared human interest in space.¹⁰ With a permanently manned multinational crew in low earth orbit (LEO), the requirement for international coordination to reach common goals provides the initial steps in developing a common understanding for responsible behavior in space.¹¹

Rather than move directly into legal mechanisms and treaty frameworks, developing a shared understanding of responsible behaviors in space is critical. In this aspect, the Cyber

⁹ Finch and Steene, 12.

¹⁰ Makena Young, "Why Cooperation Is Still Possible in a More Militarized Space," *World Politics Review* (19446284) (September 22, 2020): 7.

¹¹ *Ibid*, 8.

domain provides a template in the *Tallinn Manual on International Law Applicable to Cyber Warfare*, which codifies a spectrum of acceptable conduct in cyber operations as a non-official basis for international dialogue and negotiations.¹² While the *Tallinn Manual* does not have the enforcement of the United Nations or other governing bodies and without input from Russia or China, simply having a written starting point for military activity supports international dialogue to encourage restraint in pursuing new capabilities that might have negative consequences. The McGill Centre for Research in Air and Space Law in Canada is already attempting to create a first version of the *Manual on International Law Applicable to Military Uses of Outer Space* (MILAMOS); however, it currently has no official backing by any spacefaring nation.¹³ With space already a militarized global common, the principle aim of such a code of conduct is to prevent a strategic miscalculation or an escalatory arms race.¹⁴

To adapt the lessons presented in the Arctic security environment, simply having institutions for dialogue to find common ground with partners and competitors can establish norms of behavior. The Arctic Council presents a collaborative forum for addressing common challenges. Even though it explicitly excludes security issues in the Ottawa charter, simply having the Council provides an ability to identify and codify consensus on acceptable behavior. The International Space Exploration Coordination Group, a non-binding forum of twenty-two space agencies, could provide a similar forum for establishing consensus views on acceptable behavior in space, enhancing multilateral discussion, while still preserving the autonomy of the

¹² David Kuan-Wei Chen, “New Ways and Means to Strengthen the Responsible and Peaceful Use of Outer Space,” *Georgia Journal of International & Comparative Law* 48, no. 3 (Spring 2020): 679.

¹³ Chen, 674.

¹⁴ Lawrence J. Korb, “The Focus of US Military Efforts in Outer Space Should Be ... Arms Control,” *Bulletin of the Atomic Scientists* 75, no. 4 (July 2019): 149.

participating spacefaring nations.¹⁵ The Artemis Accords are another mechanism for establishing benefits from space exploration, although they fall short of the Arctic Council model for participation. In exchange for access to the scientific research obtained, the Accords offer a mutual benefit for agreeing to a normative framework that supports US lunar interests and is still in alignment with the Outer Space Treaty, which provides for the peaceful use of the moon.¹⁶ Space exploration is inherently complicated and costly, and joint research in multinational agreement structures develops benefits for all participants while also spreading costs. However, China and Russia signed a memorandum of understanding for a joint lunar exploration, including building a research base, demonstrating the limitations in agreements and accords that lack full participation by the spacefaring community.¹⁷ In the formative stage of international norm development, agreeing on the acceptable peacetime behavior in space allows for better framing of non-consensus behaviors that constitute competitive use of force below armed conflict and those actions that for at least one party mark the transition to conflict in space.

Deny Benefit

Denying benefit is to prevent a competitor from perceiving that they will achieve strategic goals from using force in, from, or to space. The primary means for achieving this “deterrence by denial”¹⁸ is through Space Mission Assurance, which protects space-based

¹⁵ “About ISECG,” https://www.globalspaceexploration.org/wordpress/?page_id=50 accessed 6 Feb 2020.

¹⁶ National Aeronautics and Space Administration, *The Artemis Accords: Principles for the Cooperation in the Civil Exploration and use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes*, 13 Oct 2020.

¹⁷ Namrata Goswami, “The Strategic Implications of the China-Russia Lunar Base Cooperation Agreement,” *The Diplomat*, March 19, 2021, accessed April 15, 2021, <https://thediplomat.com/2021/03/the-strategic-implications-of-the-china-russia-lunar-base-cooperation-agreement/>.

¹⁸ Mark Reith, “Brandishing Our Air, Space, and Cyber Swords: Recommendations for Deterrence and Beyond,” *Air & Space Power Journal* 31, no. 4 (Winter 2017): 107.

systems through three measures: defensive operations, reconstitution, and resilience.¹⁹ Defensive operations serve to negate a hostile act in space, either through passive defense measures such as dispersion, deception, or hardening, and active defense measures such as maneuvering and defeating threats. Passive defense in space requires a broad architecture of satellites, with ambiguity established for the function and location of each space vehicle, as well as sensors that can withstand non-kinetic attacks in the electromagnetic spectrum. Active defense requires fuel to maneuver and a robust space situational awareness system to detect potential threats. Reconstitution in space is the ability to restore functionality to space systems after a hostile act, either through on-vehicle capabilities, on-orbit spares, or launch-ready replacements. Finally, resilience is the ability to achieve the mission “in spite of hostile action or adverse conditions.”²⁰ Both resilience and reconstitution in space benefit from building a robust defense posture, with redundant platforms and commercially hosted payloads that can replace degraded capabilities.

The US’s ability to unilaterally deny benefits to other space-faring nations within the space domain is limited, primarily due to the preponderance of US reliance on satellites in orbit as a key global enabler. As commercial utilization of space continues to advance, multilateral agreements and joint ventures should yield a growing interdependence on space assets that creates a resilient architecture that may reduce the first-mover advantage in space. These space dependencies may include shared communication capabilities, shared early warning, combined payload hosting, and intelligence sharing. The recent growth of nanosatellites or “Cube Satellites,” or space vehicles that are less than one liter in volume has created the potential for an

¹⁹ Joint Publication 3-14, *Joint Doctrine for Space Operations* (Washington: Joint Chiefs of Staff, 10 April 2018): I-8.

²⁰ Joint Publication 3-14, I-8.

immensely disaggregated space architecture that makes targeting by counterspace weapons more complex and less effective.²¹ The more these systems are developed, the greater the ability to deny expected benefits for taking aggressive counterspace action.

To expand on the Law of the Sea example, the main objective in conducting FONOPS is to deny the perceived benefit of extending exclusive rights over an area or establishing an excessive ADIZ. Additionally, the security cooperation operations conducted between US regional partners and the USCG to preserve access to EEZ mineral beds and fisheries further deny the benefit of claiming access that exceeds the established rule of law. By operating multilaterally with allies and partners, the US demonstrates resolve and resilience, reducing the likelihood of an enduring advantage with claims that exceed established international law and norms. We can apply the same multilateral principles to space by establishing coalitions of spacefaring nations with shared principles and modeling normative behavior in space even while under threat of competitor offensive counterspace weapons. This approach broadens both the volume of space systems and the normative frameworks and agreements that support international space activities. The lessons from the Arctic are also abundant. When Chinese merchants use Russian pilots to traverse the North Sea Route, thereby giving legitimacy to Russian claims over the route, they also potentially gain a silent partner for their excessive claims to the South China Sea (SCS). To counter this, US FONOPS and security cooperation operations in the Arctic, the SCS, and other disputed waters all support the international rules-based order and must translate logically align with the principles that drive space strategy.

²¹ Michael Nayak, "Deterring Aggressive Space Actions with Cube Satellite Proximity Operations: A New Frontier in Defensive Space Control," *Air & Space Power Journal* 31, no. 4 (Winter 2017): 94.

Impose Cost

The final pillar of deterrence is to impose cost for actions that violate normative principles, even if they are not yet in violation of existing law. This is not the same as defeating a threat but rather establishing consequences for aggressive behaviors in space. Deterrence by cost is inherently based on perception, and the success of a deterrence strategy is dependent on the credibility of the threatened consequence and the communication of that threat.²² In the context of imposing cost as a deterrence strategy, “A critical aspect of credibility is the ability to attribute malicious activity in space.”²³ Maintaining capabilities that improve space awareness and aid attribution for hostile space activities that enable cost-imposing measures across the instruments of national power: Diplomacy, Information, Military, and Economic (DIME). Developing space capabilities is more than the fielding of equipment; it is the merger of policy, strategy, mission requirements, developed and fielded systems, and trained operators.²⁴ Because perception is key, communication of potential costs must underpin this entire cycle. However, the imposition of costs should span across domains, capabilities, and the instruments of national power; “It need not, and should not, be limited to military actions in the space domain.”²⁵ Additionally, the use of cost imposition must remain flexible and tailored to the action to preserve the credibility of response.

²² Bryan Boyce, “Twenty-First Century Deterrence in the Space War-Fighting Domain: Not Your Father’s Century, Deterrence, or Domain,” *Air & Space Power Journal* 33, no. 1 (Spring 2019): 35..

²³ James P. Finch and Shawn Steene, “Finding Space in Deterrence: Toward a General Framework for ‘Space Deterrence,’” *Strategic Studies Quarterly* 5, no. 4 (Winter 2011): 14.

²⁴ *Ibid.*, 36.

²⁵ James P. Finch and Shawn Steene, “Finding Space in Deterrence: Toward a General Framework for ‘Space Deterrence,’” *Strategic Studies Quarterly* 5, no. 4 (Winter 2011): 14.

Imposing costs must leverage existing deterrence strategy to both communicate possible consequences to competitors and condition commanders to the ways and means available to them to counter aggressive acts in space. Bryan Boyce presents an adaptation of joint doctrine in the application of multidomain flexible deterrence using the *JP 5-0 Joint Planning* definitions for Flexible Deterrent Options (FDO) and Flexible Response Options (FRO).²⁶ FDO's are designed to communicate potential costs to an aggressor to prevent a hostile action and should be implemented across the DIME to have a maximum deterrence effect.²⁷ This may include diplomatic communications, alerting the public to aggressive behaviors, targeted sanctions that reduce space research and development or technology transfer, and reprimand or exclusion from multinational institutions. On the military dimension, space FDO's should be designed to demonstrate both capability and resolve, including heightened alert postures, increasing allied wargames and exercises, and increasing activities that demonstrate enhanced active and passive defense measures. In shaping norms in space, FDO's should dominate USG activities in responding to space weapons tests that seek to establish new capabilities with undetermined applicability. FRO's, on the other hand, are a scalable and timely military response designed to be punitive and can be implemented against both regional aggressors and great power competitors alike.²⁸ As military actions, FRO's tend to be escalatory but can be conducted with proportionality and strategic communication to ultimately achieve de-escalation. Additionally, FRO's must be nested within the broader strategic guidance and focus on an adversary's critical

²⁶ Bryan Boyce, "Twenty-First Century Deterrence in the Space War-Fighting Domain: Not Your Father's Century, Deterrence, or Domain," *Air & Space Power Journal* 33, no. 1 (Spring 2019): 37.

²⁷ Joint Publication 5-0, *Joint Planning* (Washington: Joint Chiefs of Staff, 1 December 2020): E-1.

²⁸ Joint Publication 5-0, *Joint Planning* (Washington: Joint Chiefs of Staff, 1 December 2020): E-4.

vulnerabilities.²⁹ For a hostile space action, the response should not be limited to the space domain but should still logically link to the hostile action sought to be deterred from repeated further use.

To avoid exacerbating an arms race in space, the development or demonstration of any new capability must be carefully weighed against a competitor's response. Therefore, not every space capability that is developed and demonstrated should be placed in orbit. Capabilities that generate scalable and reversible effects may have the greatest deterrent effects since employment is more credible and affects a competitor's calculus. Additionally, maintaining offensive space capabilities in some form of a terrestrial garrison posture, whether on alert for launch or simply in storage, adds additional FDO steps for the commander to show force by increasing launch readiness posture before putting these systems on orbit. This parallels the Arctic security strategy lessons in enhancing the USCG ice breaker fleet without necessarily basing warships in these newly accessible waters. Simply having the capability and access now allows for a credible and communicated capability. Just as in Corbett's "fleet-in-being," a space "fleet-in-being" creates numerous FDO's and FRO's, but also create off-ramps to de-escalation that preserves the space domain in favor of US interests. The US currently enjoys the freedom of action in space, and this fleet-in-being concept is applicable in responding to attempts to deny US action.

Multi-Domain Deterrence across the Competition Continuum

The competition continuum as described in Joint Doctrine Note 1-19 describes the three states of the relationship between the US and other strategic actors as Cooperation, Competition

²⁹ Joint Publication 5-0, *Joint Planning* (Washington: Joint Chiefs of Staff, 1 December 2020): E-4.

Below Armed Conflict, and Armed Conflict.³⁰ In each of these competitive states, the application of the instruments of national power are used differently and shaping norms of behavior in space must remain consistent with the broader national strategy. In cooperative relationships, a nation promotes multilateral agreements and institutions to encourage restraint and develop shared benefits. In competition, a nation denies benefits that have been produced through cooperative engagements and communicate potential costs that may be imposed. In conflict, all three approaches are combined, denying benefit through space mission assurance, imposing costs through FRO's, and encouraging restraint through strategic communication across the DIME.

The return to Great Power Competition means that the focus on competing space architectures and associated threats and opportunities will continue to grow. "Space is both a source of and conduit for national power, prosperity, and prestige. As a result, space is a domain that has reemerged as a central arena of great power competition, primarily with China and Russia."³¹ In this competitive framework, the United States can expect that parallel space architectures will not only provide resilience against hostile actions but may also further reduce the exclusivity of shared benefits. As an example, the explosion of Position, Navigation, and Timing (PNT) satellite constellations in the past decades, such as GLONASS (Russia), Galileo (Europe), and Beidou (China), have offered similar services to GPS. This has increased the accuracy for most commercial navigation devices while simultaneously reducing the effectiveness of features such as Selective Availability, which allows the United States to reduce the accuracy of the GPS systems for non-military applications during conflict.³²

³⁰ Joint Doctrine Note 1-19, *Competition Continuum* (Washington: Joint Chiefs of Staff, 3 June 2019), 3.

³¹ U.S. Department of Defense, *Defense Space Strategy Summary*, June 2020.

³² Riazuddin Kawsar, "GNSS, Space Politics and Future of Location Based Service," *Geoawesomeness*, January 7, 2014, accessed January 4, 2021, <https://www.geoawesomeness.com/gnss-space-politics-future-pnt-based-businesses-lbs/>.

While most current space activity is taken in the context of Great Power Competition, the growing importance of space as an enabling domain raises the potential for regional conflicts that have the potential for space operations. Great power competitors may conduct limited military action in space to support limited regional goals such as Russian intervention in the Caucasus or Chinese military action against Taiwan. The extensive reliance on space-based capabilities by the United States also creates an asymmetric vulnerability that regional aggressors such as Iran or North Korea could exploit. In the context of a regional conflict, this norm-shaping approach is limited only to wars of limited objectives rather than absolute existential wars. In this type of limited objective conflict, we assume that deterrence measures can still be effective in constraining adversary action in space even if it does not completely prevent military space operations.

The critical factor for shaping international norms will leverage consistent principles and strategic communication throughout the competition continuum. The USG must engage allies and build partners with shared values to model acceptable normative behavior within the multilateral rules-based order. By establishing FDO's and FRO's that communicate the negative impact to an adversary's strategic goals without threatening regime change, the deterrence measure of encouraging restraint mitigates the risk of strategic miscalculation could lead to an unintended escalation in space. Finally, maintaining both capability and credibility for maintaining or reestablishing space control requires resilient systems that can be protected before attack, reconstituted after attack, and augmented rapidly with offensive capabilities in the event of preemptive hostile action.

CHAPTER 5: RECOMMENDATIONS AND CONCLUSION

“Our objective is to deter a conflict from beginning in, or extending to space and to enable our nation to compete in space from a position of strength. However, should deterrence fail, our imperative is clear: we will win.”¹

GEN James H. Dickinson
Commander, US Space Command

The space domain provides the United States one of its most strategic advantages in executing global operations while also presenting a critical and asymmetric risk to that capability. Both threats and capabilities are growing at a rapid pace, and the evolutionary nature of the space domain makes a sustained competitive advantage tenuous. The national space strategy must be rooted in realism, shaping normative behaviors rather than beliefs while remaining consistent with national principles across regions and domains. The USG must consistently apply deterrence efforts across the DIME using all elements of national power while remaining flexible in response to competitive actions that threaten freedom of action. Translating Julian Corbett’s principles on command of the sea to Space Control presents a viable framework for constructing this multilateral, multidomain, multi-discipline strategy to secure space lines of communication while constraining those of an adversary.

Recommendations

Cooperative public-private multinational ventures. Cooperation in commercial activities, exploration, science, and research and development create interconnectivity that incentivize all parties to consider restraint in space operations. Creating robust partnerships that generate

¹ James Dickinson, “USSPACECOM CoC - GEN DICKINSON 20 Aug 2020.Pdf” (Presented at the U.S. Space Command Change of Command Ceremony, Peterson AFB, CO, August 20, 2020), accessed May 27, 2021, <https://www.spacecom.mil/Portals/32/Documents/Transcripts%20&%20Speeches/TRANSCRIPT%20-%20USSPACECOM%20CoC%20-%20GEN%20DICKINSON%2020%20Aug%202020.pdf>.

terrestrial benefits for all spacefaring nations in the future becomes common ground for consensus activities and the limitation of orbital disruptions.

Bilateral and multilateral engagements. Developing multiple bilateral and multilateral partnerships that build a common understanding of responsible use of space in a military capacity will reinforce developing international norms. This multilateral approach of accords, agreements, and partnerships can be reinforced through wargames that focus on building a common understanding of space policy and on multinational exercises that condition military leaders to address aggressive behaviors in space.

Attribution and Awareness. Space awareness capability must be continually developed to recognize the activities and effects of adversaries and apply international attribution to the max extent possible without compromising sources and methods. Attribution should be matched with whole-of-government communication and activities across the DIME to prevent contested norms from becoming the accepted status quo.

Resilient, redundant, and recoverable systems. Due to the temporal nature of Space Control, a robust space architecture will improve deterrence if it becomes more unlikely that space capability will be effectively degraded long enough to secure adversary objectives. This resilience may come through expanding the fleet of satellites, making space systems more difficult to degrade, or through the ability to regenerate satellites either on-orbit or with readily available launches.

Cross-domain deterrence. Deterrence postures may be executed in any domain across all elements of national power. Deterrence and response options must be made available and communicated to both commanders and competitors to ensure the widest understanding of potential consequences for attempting counterspace operations.

Conclusion

While the United States maintains an advantage in space leadership, the unique nature of US global commitments also creates a vulnerability for the space-based architecture. A terrestrial crisis may first begin in space or may begin on Earth and then spill into space after initial conflict activity. The conditions established in the competition phase will also set the initial baseline for actions contemplated in a limited regional conflict. This does not mean that speed in establishing a normative framework is critical, but rather consistent principles, coherent strategy, and commitment to a rules-based international order is paramount.

The space domain is not a lawless void, but just as in the Arctic, moves to reassert or redefine the application of existing law will dictate the international norms going forward. By focusing efforts on shaping normative behaviors that align national principles across regions and domains, the US space strategy can remain properly nested within the broader national strategy. This approach to shaping normative behaviors then becomes the basis on which international norms and laws develop. Only by consistently adhering to principles that reinforce the rules-based order of the global commons during competition below armed conflict can the US expect to sustain a competitive advantage in the space domain and deny the use of space to an adversary during escalation to conflict.

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VITA

Commander Nick “Model” Collier, from Anchorage, AK, graduated from the U.S. Naval Academy in 2004 with a Bachelor of Science Degree in Quantitative Economics. He was winged as a Naval Aviator in 2006 at NAS Whiting Field, FL. He reported to the “Airwolves” of HSL-40, where he qualified in the SH-60B Seahawk helicopter. Additional education includes a Master of Science in Business Administration from the University of Florida, a graduate certificate in Cost Estimation and Analysis from the Naval Postgraduate School and is a graduate of the Air Command and Staff College (non-resident program).

In 2007, CDR Collier reported to his first sea tour with Helicopter Anti-Submarine Squadron Light FOUR EIGHT (HSL-48) in Mayport, FL. He held positions as Detachment Administrative Officer, Detachment Maintenance Officer and Squadron NATOPS Instructor, responsible for the standardized flight procedures of all squadron pilots. During his tour, he served on USS LEYTE GULF (CG 55) in support of Counter-Piracy off the Horn of Africa and on USS JOHN L. HALL (FFG-32) in support of SIXTH FLEET operations in the Baltic and the North Atlantic. In 2010, CDR Collier reported to Helicopter Maritime Strike Squadron FOUR ZERO (HSM-40) as a flight instructor for the East Coast Fleet Replacement Squadron, responsible for initial training of all East Coast pilots on the MH-60R Seahawk Multi-Mission helicopter. He served as the Public Affairs Officer, Security Manager, Lead Student Standardization Instructor, and Squadron NATOPS Flight Instructor, responsible for the standardized training of all MH-60R students and instructors.

In 2013, CDR Collier reported as an Aviation Department Head to the “Grandmasters” of Helicopter Maritime Strike Squadron FOUR SIX (HSM-46). He served as the Detachment TWO Officer-in-Charge and Air Officer onboard USS FORREST SHERMAN (DDG-98) in support of the USS THEODORE ROOSEVELT Carrier Strike Group in support of Operation Inherent Resolve (OIR) and the USCENTCOM Operations. While at HSM-46 he served as the squadron Operations Officer and squadron Maintenance Officer, directing three forward-deployed detachments and the maintenance and execution of over 6000 mishap-free flight hours.

CDR Collier served as a Branch Chief in the Wargames and Exercises Division of the Missile Defense Agency at Schriever AFB in Colorado Springs, CO. He has directed the Modeling and Simulation support to USSTRATCOM, USNORTHCOM and USCENTCOM Integrated Air and Missile Defense exercises as well as serving in critical support to the Allied Integration division of the Joint Functional Component Command for Integrated Missile Defense (JFCC-IMD).

Personal Awards include the Defense Meritorious Service Medal, Navy and Marine Corps Commendation Medal (3), Navy and Marine Corps Achievement Medal, and numerous other campaign and unit awards. He is married to CDR Tracy Spring Collier, USNR, of Dallas, TX, who have two children, Audrey (9) and Ethan (6).