

THE CLOCK TOWER SECURITY SERIES



“The Province of all Mankind”? Space and Maritime Challenges in an Era of Strategic Disruption By Mathias Katsuya

Introduction

Senior Executive Seminar 2024 was held at the George C. Marshall European Center for Security Studies from May 13-17, 2024 and brought together forty-two military and civilian practitioners for four days of discussion. The participants represented twenty-eight states and nearly forty governmental and non-governmental organizations, each with a unique understanding of current and emerging challenges confronted by their respective countries and the broader Trans-Atlantic community.

The 2024 iteration of the course was unique for its thematic, as opposed to regional, focus and centered on strategic competition within the space and maritime domains. Participants gained newfound perspectives on the enduring relevance and evolving threats of both environments, from the emergence of low-cost unmanned systems in sea-denial campaigns to the confluence of state and private sector operators in outer space. This report will begin by establishing a contextual overview of the current strategic environment, before conceptualizing maritime and space challenges through four lenses – technology and the environment; security and defense; international law and governance; and partnerships and cooperation. Finally, the report will conclude by outlining actionable measures for the Euro-Atlantic community and its external partners to strengthen the rules-based order within these key domains.

NATO and the Era of Disruption

2024 marks the 75th anniversary of the North Atlantic Treaty Organization, amidst a geopolitical context which has cemented the Alliance’s relevance as a central pillar of global security. The Russian Federation, identified for the first time in NATO’s 2022 Strategic Concept as the “most significant and direct threat” to Euro-Atlantic peace and stability, has continued its invasion of Ukraine, launching a renewed offensive in the Northeast Kharkiv region and relentlessly targeting civilian infrastructure across the country.¹ Beyond the European theatre, Russia has pursued growing alignment with the People’s Republic of China, with both states now constituting an increasingly unified threat to the rules-based international order. 2024 saw the announcement of a joint declaration by Chinese President Xi Jinping and Russian President

¹ North Atlantic Treaty Organization, *NATO 2022 Strategic Concept* (Brussels: North Atlantic Treaty Organization, 2022), 4, https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept.pdf

Vladimir Putin of a “new era” of strategic partnership, rooted in a shared pledge to resist any attempts at limiting the “economic, technological, or foreign policy potential” of either state.²

Both Russia and the PRC have also looked beyond military instruments, as they seek to advance their respective regional interests. Russian covert influence campaigns, for instance, have continually leveraged digital disinformation and the instrumentalization of foreign politicians to undermine Euro-Atlantic support for Ukraine. At the same time, the PRC has escalated its own efforts to assert control over the East China Sea, with its fusion of non-military capabilities such as information operations and the deployment of an ostensibly civilian “maritime militia” perfectly encapsulating the grey-zone confrontations that define the contemporary strategic landscape.³ Asymmetric threats, however, are not limited to the domain of great-power competition.

To the South, political instability and low-intensity conflict has escalated on the African continent. Since 2019 alone, a succession of 10 coup d'états, the greatest frequency in over three decades, have toppled the civilian governments of key Euro-Atlantic counterterrorism partners such as Niger and Burkina Faso, creating openings for deepened involvement of irregular actors like the Russian Wagner Group.⁴ Violence has similarly erupted in the Levant following the Hamas-led surprise attack against Israel on October 7, 2023. The Israeli response centered on a full-scale invasion of the Gaza Strip as well as targeted killings against militant leaders beyond its borders, including the assassination of Hamas political head Ismail Haniyeh in Tehran on July 31, 2024; the resulting wave of regional escalation has seen Iran launch its first direct strike against Israeli territory and threaten massive retaliation for the death of Haniyeh, while its Islamic Revolutionary Guard Corps has funneled military equipment to Yemeni Houthis in support of the latter's continued campaign against international shipping in the Red Sea.⁵

In effect, the Euro-Atlantic community and its external partners confront an “age of disruption,” dominated by relentless competition against two authoritarian powers in addition to an expanding array of “ambiguous” and “asymmetric” threats.⁶ Such challenges are not simply coinciding but multi-faceted, encompassing domains ranging from international waters to outer space. The defense of the rules-based order is, in other words, inextricably tied to these key environments, with the protection of the global commons constituting a strategic imperative for the Alliance and like-minded states around the world.

² Frederick Kempe, “The Biden administration is sounding the alarm about Chinese support for Russia,” *Atlantic Council*, April 8, 2024, <https://www.atlanticcouncil.org/content-series/inflection-points/the-biden-administration-is-sounding-the-alarm-about-chinese-support-for-russia/>

³ Asia Maritime Transparency Initiative, “Wherever They May Roam: China’s Militia in 2023,” *Center for Strategic and International Studies*, February 28, 2024, <https://amti.csis.org/wherever-they-may-roam-chinas-militia-in-2023/>

⁴ Christopher Faulkner et al., “Revisiting Coup Contagion,” *Foreign Policy Research Institute*, December 6, 2023, <https://www.fpri.org/article/2023/12/revisiting-coup-contagion/>

⁵ Allison Minor, “An inflection point for the Houthis,” *Brookings Institution*, January 16, 2024, <https://www.brookings.edu/articles/an-inflection-point-for-the-houthis/>

⁶ Daniel Hamilton and Hans Binnendijk, ed., *One Plus Four: Charting NATO’s Future in an Age of Disruption* (Washington D.C.: Transatlantic Leadership Network, 2022), 1-2, <https://www.transatlantic.org/wp-content/uploads/2022/02/NATO-TF-SC-final-feb-16-2022.pdf>

Technology and the Environment

Escalating strategic competition in outer space and the maritime environment is rooted in the fundamental relevance of both domains. While the significance of sea power in enabling global trade and the projection of military power is well established, technological developments have spurred an unprecedented need for goods, services, and information met only through the space and maritime domains. Today, cargo vessels move over seventy-five percent of commercial products, while undersea cables provide for ninety-seven percent of worldwide Internet traffic.^{7 8} This maritime capacity is, itself, increasingly underpinned by space-based platforms. Global Navigation Satellite Systems (GNSS) provide accurate location information to vessels and enable the Automatic Identification System (AIS), employed by ships as well as land-based authorities to maintain awareness of local traffic.⁹ In effect, advancements in technology have rendered the space and marine environments increasingly intertwined and central to the continued functioning of economies as well as societies.

The significance of outer space, however, extends far beyond these maritime applications and encompasses an ever-expanding array of vital capabilities with both military and civilian applications. The U.S. National Security Space Strategy recognizes that space-based platforms offer “unprecedented advantages” in national decision-making and military operations, from providing secure communications and satellite imagery to guiding precision munitions through the Global Positioning System.¹⁰ These very platforms, similarly, constitute an essential, albeit largely invisible, component of critical national infrastructure. Position, navigation, and timing (PNT) satellites, for instance, time-stamp financial transactions, assist weather forecasting, and synchronize the operation of electrical grids around the world.¹¹ As with the marine environment, this overwhelming degree of reliance renders outer space a domain of both strategic relevance and contestation, with the potential for devastating consequences from natural and man-made threats.

Environmental degradation represents a major source of disruption, and potential driver of competition, in the global commons. Rising sea levels and an elevated frequency of extreme weather events due to climate

⁷ Jesse Lane and Michael Pretes, “Maritime dependency and economic prosperity: Why access to oceanic trade matters,” *Marine Policy* 121 (2020): 8, <https://doi.org/10.1016/j.marpol.2020.104180>

⁸ NATO Cooperative Cyber Defence Centre of Excellence, *Strategic importance of, and dependence on undersea cables* (Tallinn: CCDOE, 2019), 1, <https://ccdcoe.org/uploads/2019/11/Undersea-cables-Final-NOV-2019.pdf>

⁹ “AIS (Automatic Identification System) overview,” NATO Shipping Centre, last modified October 22, 2021, <https://shipping.nato.int/nsc/operations/news/2021/ais-automatic-identification-system-overview>.

¹⁰ Office of the Director of National Intelligence, *National Security Space Strategy* (Washington D.C.: ODNI, 2011), i, https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/2011_nationalsecurityspacestrategy.pdf

¹¹ National Science and Technology Council, *National Research and Development Plan for Position, Navigation, and Timing Resilience* (Washington D.C.: Executive Office of the President of the United States, 2021), 3, https://www.whitehouse.gov/wp-content/uploads/2021/08/Position_Navigation_Timing_RD_Plan-August-2021-1.pdf

change place waterways and seaports at “high and growing risk” from as early as 2030.¹² The result is an increased potential for economic shocks and sociopolitical instability, particularly among states disproportionately reliant upon marine infrastructure for external trade, energy, and essential goods. At the same time, ongoing sustainable energy transitions have transformed raw materials such as lithium or cobalt, found in vast deposits in the Arctic and Indo-Pacific, into “strategic minerals” and key accelerators of competition between the Euro-Atlantic community, China, and Russia.¹³ When combined with the possibility for year-round accessibility to Arctic trade routes and resources as a result of rising temperatures, the strategic ramifications of environmental degradation, especially in the maritime domain, are unavoidable.

Beyond environmental factors, technological developments introduce new opportunities for incidental or deliberate disruption in both the maritime and space domains. Commercialization and the rise of novel platforms such as reusable rockets have rendered space more accessible than ever before, with private enterprise becoming the critical partner of governments in a “new space age.”¹⁴ Actors with previously limited space assets increasingly leverage existing commercial infrastructure, a trend already visible in Ukraine’s use of SpaceX’s Starlink satellite constellation to enable battlefield communications and even operate unmanned vehicles. This growing space presence is not without risk. In addition to concerns surrounding the legality of targeting dual-use satellites like Starlink in the event of conflict, rising launch traffic has resulted in congested orbits and an increased likelihood of accidental collisions; in fact, the European Space Agency tracks an estimated 36,500 space debris objects greater than ten centimeters in size, each one capable of inflicting severe damage, or outright destroying, existing satellites.¹⁵ While advancements in technology have, therefore, lowered barriers to the accessibility of space to both military and commercial operators, they have also set conditions that call into question the continued sustainability of space-based platforms.

Perhaps the most significant shift, however, is that actors must no longer physically access the domains they wish to affect. Cyber operations now enable adversaries to disrupt space-based platforms such as GNSS and AIS, with major implications for the safety and security of both individual users as well as the critical infrastructure reliant on these systems. In a similar fashion, the proliferation of unmanned aerial vehicles and cheap guided munitions provides an ideal means with which to prosecute effective campaigns of sea denial, allowing even actors lacking their own maritime assets to turn the ocean into a “vast no-man’s

¹² Regina Asariotis, “Climate change impacts on seaports: A growing threat to sustainable trade and development,” *UN Trade & Development*, June 4, 2021, <https://unctad.org/news/climate-change-impacts-seaports-growing-threat-sustainable-trade-and-development>

¹³ NATO Allied Command Transformation, *Regional Perspectives Report on the Indo-Pacific* (Norfolk: NATO Allied Command Transformation, 2023), 42-43, <https://www.act.nato.int/wp-content/uploads/2023/05/regional-perspectives-2022-07-v2-1.pdf>

¹⁴ Julia Ciocca et al., *The New Space Age: Beyond Global Order* (Philadelphia: University of Pennsylvania, 2021), 9, <https://global.upenn.edu/sites/default/files/perry-world-house/The%20New%20Space%20Age%20-%20Beyond%20Global%20Order%20Report.pdf>

¹⁵ “Space debris by the numbers,” The European Space Agency, accessed June 1, 2024, https://www.esa.int/Space_Safety/Space_Debris/Space_debris_by_the_numbers

land.”¹⁶ Ultimately, technological and environmental developments frame both the enduring relevance and emerging challenges of the space and maritime domains, resulting in a strategic reality in which both landscapes are more crucial, accessible, and contested than ever before.

Security and Defense

Security challenges in the space and maritime domains, thus, vary increasingly in scale and complexity. Malign actors have, on the one hand, leveraged sophisticated technical capabilities to engage in limited disruption. Russia and China, for instance, have escalated jamming and spoofing of GPS and AIS to provide erroneous vessel location data: in one 2021 incident, AIS spoofing showed NATO warships approach the Russian Black Sea Fleet’s headquarters in Sevastopol, Crimea.¹⁷ While the tracking data itself was false, such instances underscore the growing risk of disruptive technologies as implements of disinformation or even provocation. Additionally, the proliferation of advanced precision munitions among regional proxies has allowed states to cheaply achieve outsized, strategic effects. Iran’s provision of *Shahed* drones and the *Khalij Fars* anti-ship ballistic missile to Yemen’s Houthi movement enabled a surge in attacks on civilian cargo vessels in the Red Sea, forcing ship operators to avoid this maritime artery and introducing significant trade delays.¹⁸ Beyond the economic ramifications of this sea denial campaign, Houthi actions have also pushed military leaders to reconsider trends in defense development and acquisition, with one U.S. Rear-Admiral noting doubts over the sustainability of “shooting million-dollar missiles at hundred-thousand-dollar drones.”¹⁹

Such asymmetric tactics, ranging from cyber operations targeting space-based navigation systems to the use of proxies against commercial vessels, allow adversaries to undermine the rules-based order, while obfuscating responsibility and undermining the unity of a potential multi-lateral response. NATO’s 2023 Vilnius Summit Communiqué, itself, recognized that “attribution is a sovereign national prerogative.”²⁰ Some states have responded aggressively to these low-intensity strategic challenges. The Philippines has confronted the PRC’s grey-zone activities, such as the harassment of vessels by an ostensibly civilian maritime militia, through “assertive transparency,” publicly exposing instances of Chinese aggression to

¹⁶ Wayne Hughes Jr and Robert Girrier, *Fleet Tactics and Naval Operations* (Annapolis: Naval Institute Press, 2018), 238.

¹⁷ Gary Kessler and Diane Zorri, “Position, Navigation, and Timing Weaponization in the Maritime Domain: Orientation in the Era of Great Systems Conflict,” *Joint Forces Quarterly* no. 112 (2024): 14, https://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-112/jfq-112_12-21_Zorri-Kessler.pdf?ver=kb-NtlfqwhJnzE1zCcXw8Q%3d%3d

¹⁸ Defence Intelligence Agency, *Iran: Enabling Houthi Attacks Across the Middle East* (Washington D.C.: Defence Intelligence Agency, 2024), 16, https://www.dia.mil/Portals/110/Documents/News/Military_Power_Publications/Iran_Houthi_Final2.pdf

¹⁹ Tom Karako and Fred Pyle, “Operations in the Red Sea: Lessons for Surface Warfare,” *Centre for Strategic and International Studies*, May 14, 2024, <https://www.csis.org/analysis/operations-red-sea-lessons-surface-warfare>

²⁰ “Vilnius Summit Communiqué”, North Atlantic Treaty Organization, last updated July 19, 2023, https://www.nato.int/cps/en/natohq/official_texts_217320.htm

impose reputational costs and foster international support.²¹ Nevertheless, the Euro-Atlantic community and its external partners remain hindered by the absence of an overarching strategy to ensure unity of effort in an increasingly central battle of narratives and information.

At the same time, the space and maritime domains occupy a pivotal role at the opposing end of the competition spectrum, namely potential escalation into overt conflict. Both Russia and the PRC have combined marine and space-based intelligence, surveillance, and reconnaissance (ISR) assets into multi-domain sensor suites, with China expanding radar and targeting capabilities in the South China Sea through artificial islands in the Spratly Archipelago and its “Blue Ocean Information Network” of semi-submersible platforms.²² When combined with its impressive rate of naval expansion, expected to reach 425 battle force ships by 2030, the PRC is ideally positioned to action its concept of “Informationized Warfare”: leveraging its comprehensive and resilient ISR coverage to ensure information dominance and restricts adversarial freedom of movement in the weapons engagement zone.²³ Underpinning this operational framework is the sheer capacity of China’s defense industry. The PRC’s consolidation of its two largest shipbuilding companies and high levels of civil-military integration has allowed it to vastly outpace the naval growth of NATO states, expanding by the rough equivalent of the entire French Navy every four years.²⁴ In the event of conflict, Euro-Atlantic states and their external partners face the dual imperative of overcoming the PRC’s integration of space-maritime capabilities, while also tackling the industrial basis of Chinese military power.

Perhaps most significantly, the Euro-Atlantic security community confronts a growing degree of alignment between the PRC and Russian Federation. Chinese shipments of dual-use and industrial components have aided Russia’s war efforts in Ukraine, while both states have also intensified naval cooperation in the Taiwan Strait and the South China Sea. With NATO’s expansion to incorporate eight Arctic states, the Russian Federation has gradually deepened ties with the PRC in this evolving domain, signing a memorandum of understanding between both states’ coast guards and holding joint exercises off the Alaskan coast.²⁵ But it is in outer space where Sino-Russian partnership is both increasingly concerning and, potentially, vulnerable.

²¹ Benjamin Goirgolzarri and Ray Powell, “Assertive Transparency: The Philippines’ Counter Gray Zone Innovation,” *SeaLight*, October 8, 2023, <https://www.sealight.live/posts/assertive-transparency-the-philippines-counter-gray-zone-innovation>

²² Felix Chang, “China’s Maritime Intelligence, Surveillance, and Reconnaissance Capability in the South China Sea,” *Foreign Policy Research Institute*, May 5, 2021, <https://www.fpri.org/article/2021/05/chinas-maritime-intelligence-surveillance-and-reconnaissance-capability-in-the-south-china-sea/>

²³ J Michael Dahm, “Beyond ‘Conventional Wisdom’: Evaluating the PLA’s South China Sea Bases in Operational Context,” *War on the Rocks*, March 17, 2020, <https://warontherocks.com/2020/03/beyond-conventional-wisdom-evaluating-the-plas-south-china-sea-bases-in-operational-context/>

²⁴ China Power, “How is China Modernizing its Navy,” *Centre for Strategic and International Studies*, December 17, 2018, <https://chinapower.csis.org/china-naval-modernization/>

²⁵ Chuan Chen, “China-Russia Arctic Cooperation in the Context of a Divided Arctic,” *The Arctic Institute*, April 4, 2023, <https://www.thearcticinstitute.org/china-russia-arctic-cooperation-context-divided-arctic/>

Both states have notably cooperated on missile defense through the transfer of Russian-made arms and a series of joint exercises. Independently, Russia and China have amassed sophisticated counterspace systems; the PRC conducted its first direct-ascent kinetic kill in 2007, striking a non-functioning satellite with a ground-launched missile, and tested a tele-robotic grapple arm capable of capturing and moving adversarial satellites in 2013.²⁶ The U.S.' 2024 warning of a Russian nuclear counterspace system, however, introduces a new dimension to this evolving partnership. China, with its rapidly growing array of space capabilities, would view many of its assets at risk from such an indiscriminate weapon, forcing the Russian Federation to weigh any politico-military gains with the prospect of “losing [...] the few friends it has left.”²⁷ In this sense, growing rapprochement between revisionist Russia and China, a defining security challenge of the age of disruption, also presents the Euro-Atlantic community a unique avenue by which to undermine adversarial action against the rules-based international order in the space and maritime domains.

International Law and Governance

International legal frameworks concerning the space and maritime environments have struggled within this contemporary strategic context. The basic regulatory architecture of both domains is rooted in two United Nations treaties drafted during the Cold War: the 1967 Outer Space Treaty (OST) and the 1982 United Nations Convention on the Laws of the Sea (UNCLOS). OST constitutes the veritable backbone of space governance and recognizes outer space as the “province of all mankind,” outlining a corresponding freedom of exploration for all states and prohibiting the emplacement of weapons of mass destruction (WMDs) in orbit or on celestial bodies.²⁸ In a similar fashion, UNCLOS enumerates the fundamental rights and obligations of the maritime domain. Among others, the convention recognizes a state’s twelve-mile territorial sea and two-hundred-mile Exclusive Economic Zone (EEZ), establishes dispute resolution mechanisms, and identifies the International Maritime Organization (IMO) as a “competent international organization” in developing relevant standards and regulations.²⁹ Despite the historic consensus underpinning the provisions of these treaties, however, both OST and UNCLOS have come under relentless assault from an array of state and non-state threats.

Together, the PRC and Russian Federation are the primary state challengers to the rules-based order represented by OST and UNCLOS. Chinese maritime claims in the South China Sea, for instance, center on a Nine-Dash Line far beyond the UNCLOS-mandated, two-hundred-mile EEZ, with the PRC developing

²⁶ Gabriel Alvarado et al., *China’s Space and Counterspace Capabilities and Activities* (Washington D.C.: US-China Economic and Security Review Commission, 2020), 39, https://www.uscc.gov/sites/default/files/2020-05/China_Space_and_Counterspace_Activities.pdf

²⁷ Juliana Suess, “The Nuclear Option – Russia’s Newest Counter Space Weapon?,” *RUSI*, February 27, 2024, <https://www.rusi.org/explore-our-research/publications/commentary/nuclear-option-russias-newest-counter-space-weapon>

²⁸ “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 Office for Outer Space Affairs*, 1967, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>

²⁹ *United Nations Convention on the Law of the Sea* (New York: United Nations, 1982), 190, https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf

an extensive grey zone “playbook” to aggressively assert its regional interests.³⁰ From the deliberate ramming of Vietnamese fishing boats to the use of radar jamming and high-powered lasers against Filipino vessels, the PRC has exploited the ostensibly legal pretext provided by the Nine-Dash Line to continually undermine the fundamental tenets of international maritime law. While Russian maritime activity lacks the complex, military-non-military fusion evinced by Chinese grey zone tactics, the Russian Federation has not shied away from directly questioning UNCLOS' continued applicability; in December 2023, a State Duma representative announced a potential withdrawal from UNCLOS, citing provisions allowing free Arctic navigation as enabling hostile “active reconnaissance activities.”³¹ To date, neither Russia nor the PRC has chosen to denounce UNCLOS. Nevertheless, the systematic and increasing challenges posed by both states demonstrate the weakening of a nearly forty-year-old consensus on global maritime governance.

A similar pattern of violations is visible in the context of outer space. The Russian development of a nuclear anti-satellite weapon contravenes OST's prohibition on the deployment of orbital WMDs, the central tenet of the current space arms control architecture, with Russia vetoing a UN Security Council Resolution affirming the OST obligation as an “attempt to portray the Russian Federation in an unfavorable light.”³² While no other state is confirmed to be developing nuclear-based counter-space systems, adversarial actors have not hesitated to exploit gaps in OST provisions concerning the militarization of space. OST Article IV's exclusive focus on “nuclear weapons or any other kinds of weapons of mass destruction” provided a loophole for the PRC to aggressively expand its conventional counter-space capabilities, from its 2007 test of a direct-ascent anti-satellite missile to the 2013 deployment of a satellite equipped with a tele-robotic grapple arm.³³ In this sense, the space and maritime environments are united by shared challenges from revisionist powers that have continually sought to disrupt, undermine, and discredit the legal fabric constituting the rules-based international order in both domains.

Despite these threats, numerous attempts have been made to formulate alternative frameworks for space and maritime governance, oftentimes centering on the development of norm-based models of appropriate behavior. 2014, for example, saw the passage of a “Code for Unplanned Encounters at Sea” (CUES) between Pacific navies, including those of the U.S. and PRC, to outline suitable conduct and prevent

³⁰ Gaute Friis, “Introducing China’s Maritime Gray Zone Tactics Playbook,” *SeaLight*, July 6, 2023, <https://www.sealight.live/posts/introducing-china-s-maritime-gray-zone-tactics-playbook>

³¹ Kevin Rowlands and Caroline Tuckett, “Drifting Away? Russia’s Dissatisfaction With the Law of the Sea,” *RUSI*, February 9, 2024, <https://www.rusi.org/explore-our-research/publications/commentary/drifting-away-russias-dissatisfaction-law-sea>

³² “For Second Time Since Late April Security Council Fails to Adopt First-Ever Resolution on Preventing Arms Race in Outer Space,” United Nations, last modified May 20, 2024, <https://press.un.org/en/2024/sc15700.doc.htm>

³³ Danylo Stonis, “Ambiguities in Space Law as Path towards Weaponization of Space: The Case of the Outer Space Treaty. Remarks on Regulation of Weaponization of Outer Space by Space Law,” *Copernicus Political and Legal Studies* 1, no.4 (2022): 79, doi: 10.15804/CPLS.20224.08

inadvertent escalation.³⁴ Normative agreements have, likewise, played an increasingly prominent role in the space domain. The April 2022 announcement of a unilateral U.S. moratorium on direct-ascent anti-satellite missile tests was followed by a wave of national pledges by thirty-seven countries and occurred amidst meetings by a seventy-state UN Open-Ended Working Group to discuss potential rules of behavior to reduce space-based threats.³⁵ Such provisions are, undoubtedly, a significant step in ensuring a more equitable and representative system of governance in the space and maritime environments. Nevertheless, the viability of leveraging these agreements to strengthen the rules-based order remains stymied by the prevalence of loopholes, such as the failure of the CUES to prohibit hostile conduct by non-military assets, and their overall non-binding nature.

Beyond state-based threats, however, the international maritime and space legal architecture confronts a growing array of emerging, low-intensity, challenges, ranging from illicit non-state activity to commercialization. In the event of violations in international waters, contemporary maritime law provides “exclusive flag state jurisdiction” for the country in which a private vessel is registered; abuses, however, frequently go unprosecuted, with actors generally selecting “flags of convenience” (FOCs) or states which allow the registration of foreign ships with few restrictions concerning pollution, taxation, and labor laws.³⁶ This regulatory vacuum has been exploited by actors engaged in practices such as illegal, unreported, and unregulated (IUU) fishing or illicit shipping in contravention of UN economic sanctions. In addition to economic losses arising from these actions, the inability to prevent deceptive practices, like the tendency for “dark ships” to disable their Automatic Identification System, raises major doubts regarding the capacity of the rules-based order to ensure safety and accountability in the maritime domain.³⁷

While such illicit activity has yet to extend to outer space, the existing legal architecture finds itself similarly ill-equipped to address contemporary trends, namely the ever-expanding accessibility of space as a result of commercialization. The 1967 OST was introduced in a period marked by a relative dearth of space actors and lacks guidance on key concerns stemming from the proliferation of space capabilities such as collision avoidance and debris management. International standards regulating cluttered orbits, such as the U.S. Orbital Debris Mitigation Standard Practices’ requirement of a twenty-five-year limit on operational orbits,

³⁴ Jon Marek, “US-China International Law Disputes in the South China Sea,” *Air University*, July 9, 2021, <https://www.airuniversity.af.edu/Wild-Blue-Yonder/Article-Display/Article/2685294/us-china-international-law-disputes-in-the-south-china-sea/>

³⁵ Ching Wei Sooi, *Direct-Ascent Anti-Satellite Missile Tests: State Positions on the Moratorium, UNGA Resolution, and Lessons for the Future* (Washington D.C.: Secure World Foundation, 2023), iii, https://swfound.org/media/207711/direct-ascent-antisatellite-missile-tests_state-positions-on-the-moratorium-unga-resolution-and-lessons-for-the-future.pdf

³⁶ International Relations and Defence Committee, *UNCLOS: the law of the sea in the 21st century* (London: UK Parliament, 2022), 18, <https://committees.parliament.uk/publications/9005/documents/159002/default/>

³⁷ Trung Nguyen, “The Challenges of Dark Ships to the Safety and Security of Commercial Shipping and the Way Forward,” *Asia-Pacific Journal of Ocean Law and Policy* 8, no.2, 312-313, <https://doi.org/10.1163/24519391-08020007>

exist but are vastly “outpaced” by the sheer speed of technological developments.³⁸ The result is that no coherent, overarching framework for space traffic management exists today. As with UNCLOS and its associated conventions, the foundational legal framework encapsulated by OST represents a flawed architecture, increasingly undermined by an array of space and maritime challenges that were simply beyond the strategic vision of their original framers.

Partnerships and Cooperation

These contemporary strategic threats, ultimately, surpass the capabilities of any individual state and must be tackled through a cooperative approach, drawing on knowledge and resources from across national boundaries and institutions. To this end, the Euro-Atlantic community has maintained and deepened its security partnerships in both the maritime and space domains. NATO currently operates four, multi-national Standing Maritime and Mine Countermeasures Groups, in addition to supporting external coalitions such as the “Mine Countermeasures Naval Group in the Black Sea,” a trilateral initiative between Turkey, Bulgaria, and Romania to clear vital Black Sea shipping lanes of Russian and Ukrainian mines.³⁹ At the same time, the Alliance has also worked to formulate new platforms for defense cooperation in outer space. Its 2019 recognition of space for the first time as an “operational domain” prompted a wave of developments in structures and capabilities, including the 2020 establishment of the NATO Space Centre, now comprising personnel from five-member states, as a focal point for information-sharing and coordination.⁴⁰ In effect, NATO’s multilateral efforts in the space and maritime environments are best defined by ever-increasing scope and complexity.

At the same time, this security cooperation framework is complemented by an array of bilateral and regional programs spearheaded by the Alliance as well as its external partners. NATO, for instance, has sought to reinforce maritime security and intelligence cooperation with the Asia-Pacific 4 (AP4), comprising Australia, New Zealand, South Korea, and Japan.⁴¹ All four states joined NATO vessels in combined exercises, participated in counter-piracy efforts in the Gulf of Aden, and, at the 2023 Vilnius Summit,

³⁸ Mir Sadat and Julia Siegel, *Space Traffic Management: Time for Action*, (Washington D.C.: Atlantic Council, 2022), 6, https://www.atlanticcouncil.org/wp-content/uploads/2022/08/Space-traffic-management_time-for-action.pdf

³⁹ “Turkey, Bulgaria, Romania sign Black Sea demining deal,” *Le Monde*, last modified January 11, 2024, https://www.lemonde.fr/en/international/article/2024/01/11/turkey-bulgaria-romania-sign-black-sea-demining-deal_6423564_4.html

⁴⁰ Emma Palombi, “NATO’s Role in Space: How and Why NATO Space Member States Should Expand Their Purpose and Capabilities in Space,” *Air University*, June 14, 2023, <https://www.airuniversity.af.edu/JIPA/Display/Article/3427995/natos-role-in-space-how-and-why-nato-member-states-should-expand-their-purpose/>

⁴¹ Ugo Armanini et al., “NATO-ROK defence cooperation: bridging Europe and the Indo-Pacific,” *ARI* 121 (2023), 1-2, <https://media.realinstitutoelcano.org/wp-content/uploads/2023/12/nato-rok-defence-cooperation.-bridging-europe-and-the-indo-pacific.pdf>

negotiated Individually Tailored Partnership Programs with the Alliance.⁴² While the formalization of defense relations with the Indo-Pacific remains largely limited to these four states, the case of the AP4 marks a strong departure point for increased strategic alignment between NATO members and the regional allies they will have to operate alongside, a shift exemplified by the 2023 announcement of a trilateral American-Japanese-South Korean security cooperation agreement. Beyond efforts initiated by the Euro-Atlantic community, external bodies have also developed cooperative approaches to address emerging security concerns. In response to escalating piracy and IUU fishing off the coast of West Africa, Gulf of Guinea states joined together in 2013 to establish a common strategy to target illicit maritime activities. The resulting “Yaoundé Architecture” divided the gulf into five operational zones and established an Interregional Coordination Centre, enhancing information exchange and enabling combined action.⁴³ Though this regional initiative remains centered on addressing non-state threats, its applicability as a model for enhanced security cooperation in contested maritime territories such as the Indo-Pacific is undeniable.

Perhaps most significantly, contemporary strategic challenges have also pushed Euro-Atlantic states and their external partners to engage increasingly with the private sector, particularly with regards to maintaining situational awareness in the maritime and space domains. In 2022, for example, the Quadrilateral Security Dialogue – comprising the US, Australia, Japan, and India - announced the “Indo-Pacific Partnership for Maritime Domain Awareness” (IPMDA), leveraging unclassified commercial assets such as satellite radio data collection to provide authorities a common operating picture of illicit activity.⁴⁴ IPMDA remains centered on law enforcement and safety concerns, but this public-private partnership, nevertheless, provides latent capabilities in maritime surveillance and detection that could be tapped in the event of regional escalation. U.S. Space Command offers another framework for the direct integration of the private sector into military planning. Its Joint Commercial Operations cell, established in 2019, leverages academia and industry to not only provide constant space domain awareness but also emerging capabilities such as surveillance, reconnaissance, and tracking.⁴⁵ The sheer complexity of contemporary space and maritime challenges underscores a defining strategic imperative – achieving a balance in capabilities and operational planning to tackle known threats, while coping with new ones as they arise. This capacity for flexibility cannot be developed in an emergency and must be fostered through continuous cooperation across governments and, indeed, all facets of society.

The Way Forward

⁴² Hae-Won Jun, “NATO and its Indo-Pacific Partners Choose Practice over Rhetoric in 2023,” *RUSI*, December 5, 2023, <https://www.rusi.org/explore-our-research/publications/commentary/nato-and-its-indo-pacific-partners-choose-practice-over-rhetoric-2023>

⁴³ Yaoundé architecture,” Yaoundé Architecture Regional Information System, accessed May 30, 2024, <https://yaris.site/en/yaounde-architecture/>

⁴⁴ Thomas Mahnken et al., *Extending Deterrence by Detection* (Washington D.C.: Center for Strategic and Budgetary Assessments, 2023), 7-8, [https://csbaonline.org/uploads/documents/Extending_Deterrence_by_Detection_CSBA8358_\(DBD3_Report\)_FINAL_web.pdf](https://csbaonline.org/uploads/documents/Extending_Deterrence_by_Detection_CSBA8358_(DBD3_Report)_FINAL_web.pdf)

⁴⁵ Bridget Bonnette, “Joint Task Force-Space Defense Commercial Operations cell receives new name,” U.S. Space Command, last modified December 29, 2023, <https://www.spacecom.mil/Newsroom/News/Article-Display/Article/3629834/joint-task-force-space-defense-commercial-operations-cell-receives-new-name/>

Confronting this ever-expanding array of strategic challenges cannot be reduced to a single set of action steps or guidelines. A multi-faceted model is, instead, required, combining short-term institutional and capability development with deeper, enduring changes to the frameworks of international law and governance underpinning the rules-based order in the global commons. The immediate priority of the Euro-Atlantic community and its external partners, thus, centers on enhancing domain awareness and establishing a combined operational picture of their shared threat environment.

- *Regional maritime monitoring, reporting, and attribution:* Contemporary maritime challenges are increasingly complex and diffuse, ranging from IUU fishing and smuggling to state coercion through gray zone activities. Synchronizing state efforts in the maritime domain is, therefore, central, with regional-level frameworks uniquely positioned to ensure unity of action in the marine environment. Regional coordination centers, such as those established by the Yaoundé Mechanism in the Gulf of Guinea, offer an ideal mechanism for joint monitoring and incident attribution that could be expanded to contested theatres like the South China Sea.
- *Increased space-maritime integration:* Space-based platforms are central to ensuring continued situational awareness in the maritime domain, providing key capabilities ranging from basic satellite imagery to radio frequency data collection. These systems, however, cannot be successful when merely ‘sprinkled’ onto existing operational frameworks. Euro-Atlantic states must, therefore, ensure continued engagement with military, civilian, and commercial space operators from external partners to ensure that current and emerging space capabilities are integrated as early as possible into joint planning.

At the same time, the evolving spectrum of state and non-state challenges forces the Euro-Atlantic community to further strengthen its combined resiliency and strike an appropriate balance between limited, exquisite capabilities and a growing emphasis on small, cheap, and numerous platforms.

- *Coherency in the information domain:* The success of asymmetric tactics in the space and maritime domains centers on their capacity to generate confusion regarding an adversary’s identity and intentions, exploiting underlying faults in strategic partnerships to hinder effective multi-lateral responses. Currently, NATO and its external partners possess no shared framework for attributing and exposing this behavior, such as the Filipino policy of assertive transparency. If the Euro-Atlantic community, however, is to safeguard the rules-based order within the global information space, an overarching model of strategic communications, leveraging cohesive narratives and robust fact-checking, is essential.
- *Leveraging the private sector:* Industry responsiveness and flexibility is vital to ensuring states possess the necessary resources to address known strategic challenges and cope with new ones as they arise. Direct engagement of private enterprise by the military does exist, with U.S. Space Force’s Joint Commercial Operations cell offering an example of increasingly close cooperation. Nevertheless, the Euro-Atlantic defense community must deepen the scope and scale of its public-private partnerships to both streamline production and maintenance of existing platforms and foster the adaptability needed to rapidly generate new capabilities.
- *Supply chain resilience and critical infrastructure:* Despite systemic challenges posed by the PRC, Euro-Atlantic states remain heavily reliant on Chinese systems and raw materials in both domestic production and critical infrastructure; it is estimated, for instance, that ninety-eight-percent of the European Union’s demand for rare earth metals is met by the PRC, with Chinese equipment

accounting for over fifty-percent of Germany’s 5G wireless capability alone.⁴⁶ Euro-Atlantic defense preparations must, therefore, consider the economic and societal dimensions of escalation and encompass measures to ensure continued access to vital resources and services.

Beyond these developments in capabilities and structures, the Euro-Atlantic community must also work with like-minded states to ensure the continued relevancy of existing legal frameworks in the space and maritime domains and, if needed, develop new ones.

- *Modernizing space conventions*: Global governance of outer space remains centered on treaties and guidelines which largely fail to encompass the domain’s present-day challenges, from cluttered orbits amidst growing privatization to the destabilizing effect of anti-satellite weapons. An international conference comprising military, civilian, and commercial space operators represents a starting point for developing a unified understanding of these emerging threats, setting conditions for the formulation of new regulations in space safety and security.
- *Maritime regulatory task force*: In a similar fashion, contemporary maritime law finds itself poorly adapted to confront a growing array of both manmade and natural threats. As the “competent international organization” recognized by the UN Convention on the Law of the Sea, the International Maritime Organization is ideally positioned to effect lasting change. An IMO-directed regulatory task force would conduct a comprehensive review of existing maritime conventions, identifying loopholes and ensuring alignment with national as well as international priorities such as sustainability or the protection of critical infrastructure.
- *Strengthening oversight of vessel registration*: The IMO’s ability to address illicit marine activity such as IUU fishing and sanction violations is stymied by its reliance on member states with vastly differing guidelines regarding ship registries. While the prospect of granting the IMO unilateral enforcement powers is remote, increased oversight through measures such as standardized vessel registration processes or restrictions on open registries constitutes a vital step in safeguarding the global maritime commons.

Ultimately, the long-term defense of the rules-based international order in the space and maritime domains centers on the ability of Euro-Atlantic states and their external partners to continually leverage cooperation across national and, indeed, societal boundaries.

- *Accession and integration*: The security guarantees afforded by NATO membership, namely collective defense provisions under Article V of the 1949 North Atlantic Treaty, constitute the most effective deterrent against aggression. While the accession of key regional states like Ukraine and Georgia remains hindered by factors such as ongoing territorial disputes and armed conflict, it is imperative that the Euro-Atlantic community work to streamline this process where possible. The extension of NATO membership into Africa and the Indo-Pacific is, itself, unfeasible, but the formalization of bilateral relations with allies such as the Philippines would deepen the Alliance’s regional ties and strengthen interoperability in the event of crises or conflict.
- *Societal engagement and awareness*: Sustaining Euro-Atlantic efforts to secure the space and maritime domains requires the involvement of not only national governments but the public as well.

⁴⁶ “European Parliament Resolution of 17 January 2024 on the security and defence implications of China’s influence on critical infrastructure in the European Union”, European Parliament, last modified January 17, 2024, https://www.europarl.europa.eu/doceo/document/TA-9-2024-0028_EN.html

Educational campaigns leveraging all facets of strategic communications play a vital role in this, elevating awareness regarding the everyday relevance of both domains and sustaining public engagement beyond the tenure of any single political administration.

Conclusion: A Unified Front in the Era of Disruption

The strategic challenges confronted by the Euro-Atlantic community in the space and maritime environments have continually broadened in scale and sophistication. Technological advancement has rendered both domains increasingly vital to the continued functioning of societies and institutions, while also providing malign actors new capabilities to achieve effects ranging from limited disruption, such as cyberattacks against space-based infrastructure, to complete domain denial through nuclear anti-satellite weapons. International legal frameworks have struggled to keep pace with this complex and multi-faceted array of threats, pushing states to turn to one another and an ever-expanding private sector to secure the global commons.

Amidst this era of strategic disruption, the North Atlantic Treaty Organization celebrates the 75th anniversary of its founding from the ashes of the Second World War. Through the twists and turns of history since, the Alliance has stood, in the words of General Christopher Cavoli, as a “testament to what nations can achieve when they unite under a banner of common values.”⁴⁷ The defense of these values in the maritime and space domains does not fall to NATO alone and rests upon robust engagement with external military, political, and commercial partners. The notion of the global commons as the “province of all mankind,” thus, implies not simply a right but a shared responsibility to preserve and protect on the part of the Euro-Atlantic community and its allies across the world.

About the Author

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The George C. Marshall European Center for Security Studies in Garmisch-Partenkirchen, Germany is a German-American partnership and trusted global network promoting common values and advancing collaborative geostrategic solutions. The Marshall Center’s mission to educate, engage, and empower security partners to collectively affect regional, transnational, and global challenges is achieved through programs designed to promote peaceful, whole of government approaches to address today’s most pressing security challenges. Since its creation in 1993, the Marshall Center’s alumni network has grown to include over 16,000 professionals

⁴⁷ Christopher Cavoli, “NATO at 75: Charting a New Course”, (speech, Washington D.C., April 8, 2024), Georgetown University Center for Security Studies, <https://www.youtube.com/watch?v=CkkvkqJIsM>

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