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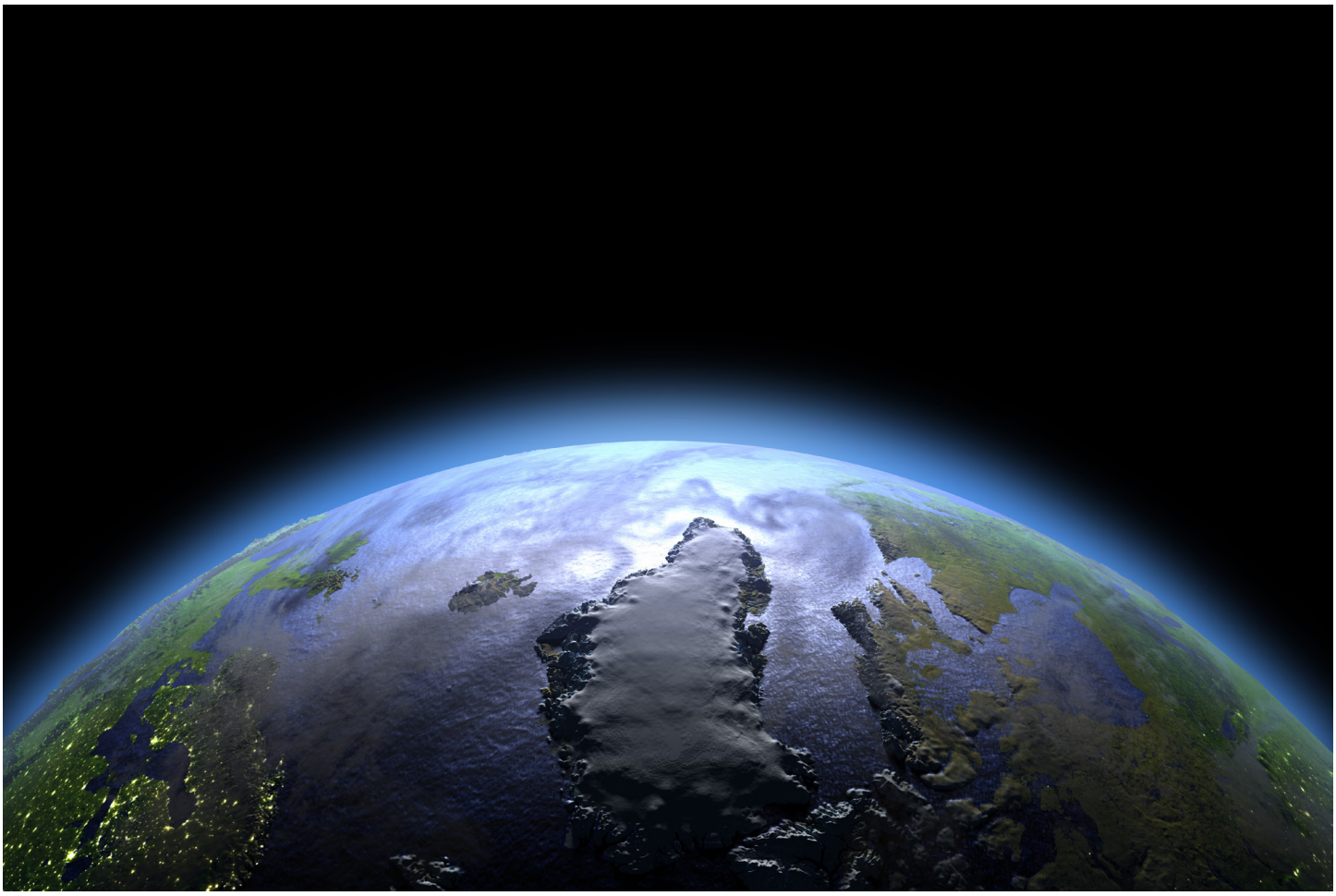

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Leveraging the Joint Capacity of Arctic Allies and Industry Partners

Pathways to Enhance Multi-Domain Awareness and Communications Through Minilateral Cooperation

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Executive Summary

As great-power competition extends to the Arctic, the United States and its allies will need a strengthened focus on and investment in regional security and North American continental defense to close situational awareness and capability gaps. Washington's allies have assets to help support US national security interests, enhance deterrence, and make critical contributions to Arctic operations and capability development. Forging deep partnerships, building up allied and US capabilities, and reforming procurement regulations to allow greater integration with trusted international and industry partners offers the United States and its partners cost-effective solutions to maintain their competitive technological edge and address security gaps at the speed of relevance while meeting sensitive security standards.

This report assesses best practices and lessons learned from recently launched bilateral, trilateral, and minilateral initiatives that aim to enhance Arctic maritime and space domain awareness, presence, and communications through joint defense industrial development and international partnerships. While discussing a variety of initiatives, it focuses on the Arctic Satellite Broadband Mission (ASBM) between the United States and Norway, and the Icebreaker Collaboration Effort, or ICE Pact, between the United States, Canada, and Finland. It assesses both initiatives' success and potential in achieving their core focus and their capacity to serve as vehicles to reform the acquisition system and further boost the US industrial base. It also discusses the initiatives' potential to be scaled up to include other like-minded partners, including via NATO, or serve as models for future capability initiatives.

To develop and procure urgently needed capabilities and systems in support of Arctic domain awareness and operations, the United States should use the high-level political focus on the Arctic theater and associated initiatives that can help drive progress to:

- **foster a whole-of-government approach to devote resources to this effort and strengthen the public-private ecosystem.**
    - Political leadership in the executive and legislative branches can help overcome technical and legal obstacles and send necessary demand signals to industry. High-level political attention is especially critical for advancing strategic priority areas that have suffered from underinvestment, including the specific need for icebreakers and Arctic capabilities more broadly.
    - At a time when adversaries are deepening military-civil fusion to advance dual-use capabilities, the United States and its allies should strive to maximize the potential of their commercial industries and minimize government or national compartmentalization and public-private silos.
    - The United States should also take a more holistic approach to deeply interconnected global threats and theaters, and prioritize integrated planning across USNORTHCOM, USEUCOM, and USINDOPACOM to address growing Russia-China alignment in the Arctic.

- **find flexible approaches to integrate international and commercial partners into the defense acquisition system. This should include:**
  - addressing persisting technical and legal obstacles, such as export controls, procurement rules, and visa regimes that limit workforce exchange and development.
  - prioritizing compatibility when designing new capabilities. Where possible, the United States and its international partners should minimize optional customization of assets that prolongs production timelines. Using cost-effective, off-the-shelf solutions can help plug urgent capability gaps in some cases;
  - combining short-term fixes, including presidential waivers, with reform to facilitate systemic shifts required to revive niche national-security priority industries and drive innovation.

- **optimize information sharing and interoperability through a more nuanced approach to classification levels and information sharing by:**

  - continuing and deepening forums that allow international and industry partners to gather regularly, identify shared interests and challenges, and facilitate cross-sector innovation;
  - continuing to invite key international and commercial partners to exercises and training, including in the Arctic and in the space domain, to optimize interoperability, identify operational obstacles and shortfalls, and test new technologies and capabilities;
  - addressing cultural issues that impede innovation and opportunities for collaboration in a risk-averse security community;
  - prioritizing compatibility of classified conferencing and messaging networks, satellite networks, and ground infrastructure. Developing scalable solutions that can be offered to international partners will also allow commercial providers to remain competitive.

Introduction

The security posture of the United States and its allies in the Arctic is critical to North American continental defense. Russia's and China's growing regional investment and civil-military cooperation have increasingly focused US and allied attention on the theater in recent years. But Arctic capabilities and dual-use infrastructure, both of which are urgently needed in response, have specific requirements, are expensive, and are challenging to develop. Competing global defense commitments and priorities that demand US attention have impeded the necessary investment to meet current and future needs.

Allies help support US national security interests in the Arctic. As this report outlines, they make critical contributions to Arctic operations and capability development, and many have expressed their desire to deepen operational and industrial cooperation with the United States. Closer cooperation with international partners not only enhances deterrence; a pooling-and-sharing approach can also reduce costs and help accelerate capability development while meeting sensitive security standards if technical and legislative obstacles are overcome.

This report's central aim is to highlight and assess best practices and lessons learned from recently launched bilateral, trilateral, and minilateral initiatives that aim to enhance Arctic maritime and space domain awareness, presence, and communications through joint defense industrial development and international partnerships. It draws on case studies to discuss how formats involving a small number of international and industry partners can fill gaps in Arctic security and in command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) at the speed of relevance, while preserving resources. This report also assesses the initiatives' potential to be scaled up and to serve as vehicles to reform the US defense industrial base. The analysis draws on open-source government documents, policy analysis, and anonymized interviews with leading experts and officials from North America and Northern Europe.

The first section discusses current threats in the Arctic and the need to fill capability gaps in North American continental defense and security posture.

The second section briefly outlines different formats of collaboration and mechanisms that enable the United States to develop, build, or procure capabilities with international and commercial partners to preface the case studies outlined in the third section.

The third section assesses collaboration on space capabilities that support Arctic domain awareness and communications. It primarily focuses on the Arctic Satellite Broadband Mission (ASBM) between Norway and the United States (with involvement of commercial partners and the EU). It also discusses obstacles and future pathways for collaboration in space capability development and joint operations.

The fourth section focuses on the Icebreaker Collaboration Effort, or ICE Pact, between the United States, Canada, and Finland. The initiative is in its infancy, but this paper outlines the pact's strategic importance and value. It also discusses its potential to revitalize the US shipbuilding market and construct urgently needed icebreakers and other Arctic capabilities while addressing remaining hurdles to cooperation.

The conclusion summarizes the strategic necessity of defense industrial cooperation and outlines recommendations to address obstacles that impede joint capability development and procurement with allies and commercial partners that support Arctic operations and C4ISR.

May 2025

Regional Threats and Allied Defense Posture

Within the last two decades, the Arctic has evolved into an arena of geostrategic competition. To harness and protect the economic potential of the resource-rich Arctic Zone of the Russian Federation (AZRF), the Kremlin has invested heavily in civil, military, and dual-use infrastructure and capabilities that support resource extraction, shipping, and security interests. Russian military investments seek to enhance anti-access/area denial (A2/AD) ambitions and protect strategic assets. Moscow continues to prioritize its air and naval posture in the Arctic despite a focus on the war against Ukraine.[1] Russia continues to modernize its nuclear[2], conventional, and dual-use missile technology, challenging North American homeland defense.

Russia has also stepped up its cooperation with China in the Arctic within the last decade, setting aside long-held concerns about Beijing's presence in the region. The Arctic is not a "core interest" to China, but analysis from Chinese military strategists casts both poles as strategically critical for global power projection.[3] China has sought to slowly increase its dual-use regional presence through infrastructure investments supporting its "Polar Silk Road" and its "Digital Silk Road", science diplomacy, civil-military and military cooperation with Russia, and by launching satellites into polar orbit to enhance surveillance and information dominance. [4] As the seven NATO Arctic countries have grown more suspicious of China's strategic ambitions, coercive economic policy, and surveillance risks, Russia has become Beijing's partner of choice to facilitate access to the Arctic. Russia's self-inflicted economic vulnerability and political isolation following its 2014 invasion of Crimea and 2022 full-scale war against Ukraine have contributed to Moscow's embrace of such cooperation.[5]

A memorandum of understanding (MoU) to facilitate maritime law enforcement cooperation between Russia and China, in addition to joint naval and air maneuvers near Alaska, has called attention to the evolving partnership and its potential to challenge US security interests and sovereignty.[6] These developments demand more US investment in naval, air, and coast guard assets, and dual-use infrastructure in and around Alaska. Russia-China cooperation in the Arctic also demands a more integrated posture across the Atlantic and Pacific. US forces in Alaska play a critical role for power projection into the Indo-Pacific. In this context, the United States stands to benefit from a continuation and deepening of collaboration with its allies and partners in Europe, North America, and in the Indo-Pacific. Cooperation with Canada and the Kingdom of Denmark is important to maintaining and advancing situational awareness and North American continental defense.

To this end, NORAD modernization and cooperation between Canada and the United States is critical. Arctic Over-the Horizon Radar (A-OTHR) and Polar Over the Horizon Radar (P-OTHR), which will advance situational awareness and missile defense, are expected to be fully operational by 2031 and 2033, respectively.[7] Canada is also modernizing its military C2 information and satellite communication systems, which are expected to be fully operational by 2036 and 2040, respectively. In the meantime, gaps in situational awareness and missile defense remain. Bilateral cooperation with Canada on NORAD is not covered in the case studies, although Canada's procurement of Australian radar technology[8] demonstrates the opportunities to cooperate with industry partners from third countries, especially those within Five Eyes.

The Iron Dome for America Concept, or Golden Dome, proposed by the Trump administration outlines ambitious plans for missile defense. At the time of writing, little information is available about the Department of Defense's (DoD) plans for Golden Dome, which could be a spectrum of missile defense and sensor systems. As of May 2025, DoD is undergoing a feasibility study assessing different options. The House Armed Services Committee's proposed reconciliation bill contains billions of dollars in support of the initiative, including $5.6 billion for space-based and boost-phase intercept capabilities and $7.2 billion for space-based sensors.[9]

To address gaps and minimize cost for future capabilities and operations, the United States can take advantage of its alliances and combined defense industrial potential. It should deepen collaboration with allies and commercial partners to pursue cost-effective solutions to maintain its competitive edge, and defend and deter against threats from strategic competitors. This is in line with the Trump administration's expressed emphasis on managing government resources efficiently while reprioritizing US navy and shipbuilding investments, focusing on the Indo-Pacific, and boosting US space dominance and homeland defense.[10]

As the first Trump administration's 2018 National Defense Strategy emphasized, "When we pool resources and share responsibility for our common defense, our security burden becomes lighter. Our allies and partners provide complementary capabilities and forces along with unique perspectives, regional relationships, and information that improve our understanding of the environment and expand our options."[11] Strategies and policies under the Biden administration embraced a similar rationale by focusing on international partnerships. The US DoD 2024 Arctic Strategy emphasizes the importance of enhancing Arctic domain awareness, while "engaging with Allies, partners, and key stakeholders; and exercising tailored presence" in response to Russia-China cooperation. The United States has the opportunity and has already outlined important steps to capitalize on efforts started during prior and current administrations to advance relevant priorities.

Mechanisms for Defense Industrial Cooperation With Allies

The United States can cooperate with international partners through bilateral, trilateral, multilateral (through NATO), or minilateral formats. The last bring together small groupings of like-minded nations, usually outside established multilateral frameworks. These groupings can serve as force multipliers, leveraging the capabilities of several nations without sacrificing ambition, which is often hampered by lowest-common-denominator decision-making of consensus-based organizations. Recent years have seen the emergence of minilateral groupings or "Flexible Formats" within NATO.[12] These formats are housed under or facilitated by NATO but do not require the support or participation of all 32 allies.

Minilateral approaches can create incentives to invest in priority capabilities that lack broader industrial demand by sharing costs and risks, and capturing a broader market. Bilateral and trilateral efforts may also be scaled up to include other allies and partners if successful.

The United States can build on these mechanisms and leverage "the industrial capacity of American partners and allies" through "robust international partnerships to build the systems needed for current and future contingencies".[13] A 2023 report by Jerry McGinn and Michael T. Roche provides a helpful overview of these mechanisms for defense industrial cooperation. These include coproduction, licensed production, cooperative programs, foreign military sales, and direct commercial sales.[14] The report specifically highlights the role of (1) foreign companies' US subsidiaries; (2) co-development of defense "systems or subsystems" by the United States and partner countries; (3) coproduction of a defense system (a process that requires technology transfers "from the country of origin to countries producing the system"); (4) second-sourcing, licensed production, or dual sourcing, to "qualify two producers for the part or system"; and (5) sustainment of existing systems through "maintenance, repair, or overhaul".[15]

The report also highlights different "enablers" to support defense industrial development that the United States can leverage to develop, build, and sell capabilities to international partners, including via "Reciprocal Defense Procurement MOUs,[16] Security of Supply Arrangements,[17] … Defense Exportability Features (DEF), and the National Technology Industrial Base (NTIB)".[18] Moreover, it addresses newer initiatives that can help overcome persistent obstacles in defense industrial cooperation, including AUKUS and NATO's Defense Innovation Accelerator for the North Atlantic (DIANA).[19] The ICE Pact, launched in 2024, also has that potential.

Despite these promising mechanisms and drivers, many obstacles remain. Difficult and lengthy procurement processes leave many formats underexplored in practice. Key obstacles highlighted by the report include "export controls, technology security and foreign disclosure, the defense acquisition system, and Buy America". The following case study chapters will discuss in more detail applicable obstacles and drivers. The analysis will assess the potential of the ICE Pact and different space initiatives to serve as enablers that help optimize capability development with international partners and as options that may be scaled up to include additional partners.

Minilateral Space Collaboration

On August 11, 2024, SpaceX's Falcon 9 rocket successfully launched two satellites into orbit as part of the Arctic Satellite Broadband Mission (ASBM).[20] The mission was a collaborative effort between DoD, the Norwegian military, and US and Norwegian government and commercial partners. Northrop Grumman (a US company) manufactured the satellites, which were launched from the Vandenberg Space Force Base in California. State-owned Space Norway owns the satellites, which are operated by its subsidiary HEOSAT, Viasat (also a US company), and the US Space Force. The satellites carry multiple, separate payloads, including US Space Force-owned military communications payloads for the Arctic, a Norwegian armed forces-owned military payload, and a commercial payload for Viasat.[21] This arrangement, which fulfills DoD requirements, demonstrates the potential for industrial cooperation with international partners to advance US and allied capabilities while also maintaining maximum security and control over data flows and C2. The launch was historic. It was the first time that the United States launched an active, operational DoD payload on an international spacecraft. Moreover, the mission offers a valuable model for future space collaboration, including in the Arctic.

One of the satellites also carries a Norwegian Radiation Monitor (NORM) built by the European Space Agency (ESA) and Integrated Detector Electronics AS (IDEAS, a Norwegian company) to "observe the radiation environment in orbit and gather data for the development of radiation protection for ESA's Galileo Second Generation constellation by measuring the kinetic energy of charged particles in space".[22] This connection to the ESA and the EU´s Global Navigation Satellite System (GNSS) Galileo adds to the project's minilateral character.

Alignment With Strategy for International Partners

ASBM aligns closely with the principles of the new Space Force strategy for international partnerships, as described by the chief of space operations, General B. Chance Saltzman. At the April 2025 Space Symposium in Colorado Springs, Saltzman outlined the new strategy's three core goals: "capitalizing on partner strengths, improving data and system interoperability, and aligning service-level force development across allied nations".[23] ASBM achieves integration and interoperability of allied nations and reflects the alignment of force development among close partners to address a critical need in the Arctic. It offers protected communications above the 65th parallel north and communications for combatant command and control centers south of that latitude.

ASBM also shows the financial value of such partnerships. A 2022 US Space Force assessment outlined that the United States could generate "potential savings of up to $900 million" by partnering with Norway instead of pursuing the mission on its own.[24] Integrating capabilities with close partners allows the United States, Norway, and other allies to achieve more capability in space with fewer resources. As Saltzman indicated in his discussion of the international partnerships strategy, "Spacepower is the ultimate team sport. …The domain is too big, too complex, too dynamic for a single nation to secure alone."[25]

This mission came about through discussions in 2019, spurred in part by a DoD team considering additional payloads for the Arctic as part of an analysis of alternatives for protected satellite communications. In exploring possibilities for bringing new partners into other constellations, and concurrent with the studies for satellites in the polar region, a DoD team participated in a meeting in Oslo in which the Norwegians presented plans for launching two communications satellites with Arctic coverage. The alignment of Norway's and the United States' force development needs, and the two countries' close and long-standing partnership on intelligence sharing (which also covers space command), along with broader defense and defense industrial cooperation, allowed the project to be realized. In May 2019, the United States and Norway signed an Arctic MILSATCOM agreement,

or Memorandum of Agreement (MOA), that enabled deeper cooperation and played an important role in this context.[26]

Expanding to Commercial Partnerships

ASBM does not simply represent an intergovernmental partnership but also a commercial partnership, due to Viasat's involvement.[27] The growing convergence between defense and commercial space systems has been one of the most important trends in national security space over the last decade. Private companies have developed a spectrum of commercial assets and services that offer attractive national security applications, including electro-optical imagery, synthetic aperture radar, radio-frequency mapping, hyperspectral imagery, space situational awareness, and new models for satellite communications. As seen in the war in Ukraine, commercial space services can be valuable for defense purposes in conflict. Despite not having much experience with space systems or any of its own sovereign spacecraft, Ukraine's military has used commercial space services to great effect.[28]

On April 9, the Trump administration issued an executive order on reforming defense acquisitions, which calls out the preference for "commercial solutions".[29] This is consistent with recent strategies and guidance from the Space Force and acquisition centers in that agency, such as Space Systems Command, that promote buying commercial services instead of building new government capabilities.[30] Similar to allies leveraging each other's strengths to achieve more capability with less investment, buying commercial services can save money and time in comparison to building new spacecraft and space systems from scratch.

In addition to using US commercial space services, DoD is also integrating and using foreign commercial space services. The Space Force has a project in its budget to integrate commercial satellite communications capabilities from Luxembourg. Specifically, the project "is an initial effort for the [Space Force] to partner, explore, prototype, and integrate an international commercial SATCOM service into the DoD SATCOM enterprise".[31] The budget documents also note that the partnership will "enable additional international partners to join".[32] Although this project is not specific to the Arctic, it reflects another model for the United States and its allies for collaborating in minilateral partnerships to achieve capability for Arctic operations.

Challenges for Defense Space Collaboration

There is a reason why ASBM is the first DoD integration of an active, operational payload with a foreign spacecraft. Defense space collaboration on capability development is challenging, in part due to classification and releasability of information. As reported by the Aerospace Corporation, "No issue presents a greater impediment to defense space partnerships than an inability to share information."[33] Defense space information is often classified and designated NOFORN (not releasable to foreign nationals). Such classification or dissemination control limits defense space collaboration. At times, this process is unnecessarily prohibitive. For example, a foreign partner could share sensing data with the United States, which is then processed through NOFORN software and rendered unavailable to the same country that captured it. This issue has received attention at senior levels.

Logistical hurdles and incompatible systems and standards complicate defense space partnerships with international partners. Classified conferencing capabilities and networks can be a hurdle. DoD's classified SIPRnet secret-level computer network was not designed with international partners in mind.[34] In addition, governments, industry, and international organizations often use different data-sharing standards for space situational awareness, which, at best, aggravates and, at worst, prevents data sharing.[35]

What's Next?

As the Arctic grows in importance, space systems to support communications in the region are urgently needed. For space-based communications, NATO, inspired by ASBM, is facilitating the "Northlink" initiative, through which 13 allies[36] will explore the development of secure, resilient, interoperable, and reliable satellite communications above 65 degrees latitude.[37]

Northlink includes two ongoing efforts. The first is focused on commercial satellites to provide short-term, accessible communications. The second is focused on military satellites to provide cutting-edge, anti-jam capability. The commercial satellite communications effort will take advantage of the existing NATO Support and Procurement Agency's (NSPA's) Global Commercially Contracted SATCOM Support Partnership (GCC SATCOM) to achieve economies of scale through flexible contracting that pools international requirements. The pursuit of commercial capabilities makes sense. Many current commercial providers may be able to provide satellite communications in support of Arctic operations, including Intelsat GEO (based in Luxembourg), SkyPerfect (Japan), Telesat GEO (Canada), and Iridium (United States).

Importantly, the military satellite communications effort under Northlink is NATO-facilitated rather than NATO-led. In other words, NATO is establishing a minilateral forum for countries to discuss and negotiate partnership and collaboration arrangements for any military satellite communications capability that it facilitates. This effort could end up resembling ASBM. A small number of countries could integrate capabilities, perhaps with commercial partnerships, using a hosted payload approach to reduce costs and ensure interoperability. It could also follow the model used by the United States for the Wideband Global Satellite Communications System (WGS), which provides broadband communications to the US military and international partners. Countries such as Canada, Czechia, Denmark, Luxembourg, the Netherlands, New Zealand, and Norway pay for WGS bandwidth rather than owning a discrete component of the constellation.[38] Using this approach, one country could acquire the constellation in support of Arctic operations and have other interested parties pay them for using it.

Other Capability Areas

There are additional space capability areas that could provide opportunities for regional minilateral partnerships.[39] Sweden and Norway have spaceports, and NATO's STARLIFT initiative allows allies to explore ways to strengthen the alliance's access to and use of space. Norway and the United States recently signed a Technology Safeguards Agreement (TSA) that will facilitate the launch of US launchers and satellites from the Andøya Spaceport.[40] The United States and Norway have also partnered to open the Space Development Agency Ground Entry Point at Andøya Air Station to "support space infrastructure for situational awareness and communications on command, control, and … missile warning for Norway and NATO regarding possible incoming cruise missiles in the High North."[41] The Ground Entry Point is remotely operated from the United States, and the Norwegian Armed Forces are involved in physical security of the site.

Remote sensing from space could also be valuable for Arctic operations. Several NATO countries have remote sensing capabilities, and many compelling commercial options exist that could offer services for the Arctic. This includes Airbus' Pleiades Neo and Neo Next systems (from France), Planet (United States), and GEOSAT (Portugal) for electro-optical imagery; Iceye (Finland), eGEOS (Italy), Capella Space (United States), and MDA's Radarsat-2 (Canada) for synthetic aperture radar; HawkEye360 (United States), Unseenlabs (France), Kleos Space (Luxembourg/United States), Orbcomm (United States), and Myriota (Australia) for radio frequence mapping; and GHGSat (Canada) and Orbital Sidekick (United States) for hyperspectral imagery.

Examining Models

The United States and its close allies should continue exploring partnership and collaboration opportunities for space capabilities to support Arctic ISR and operations. This is an area that lends itself to minilateral partnerships given that countries such as Norway, Canada, Sweden, and the United States are mature and growing space nations with a deep interest in the region. Countries should consider several approaches including:

- a hosted payload model, with ASBM having established the precedent
- commercial, including foreign commercial, options for buying services
- a WGS approach in which one nation leads the constellation or capability and incorporates other partners that can subscribe to the capability and offset some of the cost

The United States is developing its vision for the type of force structure it will need in the future. As the country considers decisions on areas to prioritize, it should look to international partners and commercial capabilities as potential contributors to its desired architecture. This will require continued assessment of allied governmental and commercial capabilities for meeting US Space Force needs and consistent engagement with allies and partners on their developmental needs for space. As seen in the development of ASBM, these types of arrangements and partnerships take years to plan and achieve but are worth the effort and time.

Minilateral Icebreaker Development

The ICE Pact is a trilateral effort between Canada, Finland, and the United States, signed in November 2024, to build "best-in-class Arctic and polar icebreakers and other Arctic and polar capabilities in each of [the three] countries by sharing expertise, information, and capabilities."[42] It has four working groups:

> **Working Group 1** focuses on technical exchanges and information sharing efforts, which are a cornerstone of planning and executing icebreaker construction. Its key task is easing export control regimes that have complicated the exchange of technical information in the past.
>
> **Working Group 2** focuses on workforce development. Its main goal is identifying ways to facilitate the exchange of skilled workers and technicians to work and train in each country's shipyards.
>
> **Working Group 3** focuses on international engagement. Its ultimate goal is to expand the global market for the highly specialized ice-capable shipbuilding sector to the benefit of ICE Pact member companies, thereby increasing their competitiveness.
>
> **Working Group 4** focuses on R&D and future technologies. This group, whose scope remains fluid at this time, aims to integrate new technologies into the shipbuilding sectors of all three countries to ensure future Western dominance of the high end of shipbuilding.

Each nation's efforts are overseen by a national ICE Pact coordinator, and each working group has a lead from each participating nation. Coordinators meet quarterly, and working groups meet more regularly. The national coordinators last met in Helsinki in March and are expected to meet in Ottawa in June.

Strategic Necessity of ICE Pact

The ICE Pact addresses the need for Arctic maritime domain awareness and presence and seeks to revitalize and equip the shipbuilding sectors in the pact countries to capture the global market for icebreakers and sophisticated vessel construction.

Russia has the world's largest fleet of icebreakers (including nuclear-powered and combat-equipped)[43] on which it relies to project military power in the Arctic and advance the viability of the Northern Sea Route (NSR). Despite having no Arctic or Antarctic territory, China is investing in icebreaker technology and outpacing the United States. It currently has three icebreakers, and construction of a fourth will start in 2025. China also dominates the commercial shipbuilding market (building 75% of all orders in 2024).[44] The US shipbuilding sector has focused on military orders, securing about 40% of the annual $80 billion global military shipbuilding market.[45] Finland and Canada have relatively healthy shipyards with a specialization in icebreakers and other highly technical construction. Together, the three countries have the potential to emerge as global leaders in this high-end segment.

Icebreakers are a relative niche capability, but if the United States can demonstrate it can deliver an icebreaker on time, market demand can sustain this industry. As Russian and Chinese cooperation, and the two countries' naval and coast guard presence, in the Arctic grows, there will be a greater demand from the United States, Canada, Finland, and other allied nations for ice-capable vessels. China's growing focus on expanding its presence at both poles, the increase in Arctic shipping facilitated by waning sea ice coverage, and a potential scramble over influence in the Antarctic may increase the interest in polar-capable surface vessels and other capabilities among partner countries, including those in the Southern hemisphere. Experts estimate that the global market of friendly and aligned nations will have demand for approximately 70-90 icebreakers in the next decade, plenty to keep their yards busy.[46]

For the United States, the ICE Pact is a strategic effort to revitalize the domestic shipbuilding industry by developing specialized expertise, shipyard capacity, and producing urgently needed and technically complex vessels. The last US icebreaker was built in the 1970s and the US Coast Guard (USCG) now has only two functioning polar class icebreakers, with an additional commercial medium-sized vessel with icebreaking capabilities[47] being retrofitted.

Finland, which operates eight icebreakers and is modernizing its icebreaker fleet,[48] is the acknowledged global leader in icebreaker design and specialty construction. The country has a skilled workforce with a track record in building icebreakers in a remarkably short time and within budget. Finnish shipyards and companies have built 60% of the world's icebreakers and developed approximately 80% of icebreaker designs.[49] Finland sees working group 4 as crucial to ensuring Western allies' technological lead on icebreaking and ice-capable construction by guiding national research priorities in industry and at universities, and aligning its industrial focus with US and Canadian technological needs.

Canada has 18 icebreakers of various sizes[50] and is implementing a "fleet renewal plan".[51] To deliver two new polar icebreakers by the early 2030s, construction work is being done by two shipyards: Seaspan's Vancouver Shipyards, which is US-owned, and Chantier Davie Canada Inc.,[52] which purchased Helsinki Shipyard in November 2023.[53] Ottawa's ICE Pact objectives are driven by national security priorities[54] and focus on the Arctic. Finland and Canada already closely cooperate on technical exchange and information sharing and remain focused on bringing the United States into this consortium to create a core collection of yards, workforces, and government orders to become the preferred supplier of high-end vessels now and in the future. Sweden and Denmark are reportedly interested in either joining the ICE Pact or placing orders, a signal indicating the potential for growth.

Alignment with Strategy

The ICE Pact initiative aligns uniquely with US interests in revitalizing the shipbuilding industry and capacity of the USCG and Navy. Recent statements and executive orders issued by President Donald Trump highlight this and have set in motion processes to achieve key objectives, among them the establishment of a new White House Office of Shipbuilding[55] and efforts to enhance maritime expertise. The first Trump administration already emphasized the need to boost USCG's icebreaking capabilities by FY2029 and potentially lease icebreakers[56] from allies to address imminent needs. The importance of cooperating with allies to boost USCG's icebreaking capabilities is reinforced by DoD's 2024 Arctic strategy[57] and the Implementation Plan For the 2022 National Strategy for the Arctic Region.[58]

What's Next: Addressing Challenges for Icebreaker Development

The ICE Pact project has been described as a "generational effort" requiring a structural shift and strong political will.[59] Trump's statements on ordering 40 icebreakers[60] have provided impetus for action, and his meeting with Finnish President Alexander Stubb[61] may have resulted in future orders for icebreakers constructed in Finnish yards. There also appears to be a growing consensus on the need to lower barriers to cooperation with allies and provide more clarity and capacity for long-term planning for industry. Clear political signaling to the private sector is critical to incentivizing its investments in infrastructure and workforce development, and energizing national industrial bases across the pact countries. The main obstacles to success of the ICE Pact are the relative weakness of the US shipbuilding industry and lack of icebreaker construction knowledge, the vastly different models of shipbuilding in each country, and restrictive export control regimes.

Shipbuilding: Procurement Rules Impact on Shipyards and Workforce

Long-term sustainable solutions for shipbuilding and workforce development are needed in the United States. The country's shipbuilding industry has largely atrophied, with export controls and procurement rules contributing to the decline. US procurement rules require the selection of the lowest bidder for government contracts (but may accommodate prices adjustments later).[62] This process leads to unrealistic budgeting and rising costs, and limits the United States' ability to select the qualitatively best providers.

The USCG's continued difficulties in replacing the vessel Healy, with estimated costs ballooning beyond the original amount Congress appropriated for it demonstrate the challenge. The USCG initially awarded the contract in 2019 to Mississippi shipyard Halter Marine Inc., which Bollinger Shipyards purchased three years later.[63] Due to challenges from design development and a lack of specific welding expertise, the program has been set back by cost overruns and timeline extensions. The vessel is now expected to be commissioned by 2030, six years behind schedule. [64] The newly formed United Shipbuilding Alliance between the Bollinger Shipyards and Edison Chouest Offshore has the potential to expedite US shipbuilding.[65]

Reforms to these procurement rules or exemptions for ice-breaking capacity projects, along with efforts to tailor workforce development, would give the ICE Pact a major boost. The US Maritime Administration (MARAD) has called on industry to submit its assessments of US shipyards' readiness to construct ice-capable vessels and to outline key areas for necessary development. [66] This is an important prerequisite to initiating shipyard modernization efforts. Consistent with the executive order "Restoring America's Maritime Dominance" and the mission of the ICE Pact working group on workforce development, greater US shipbuilding expertise may be facilitated through apprenticeships and programs aimed at exchanging skilled workers and developing specific skills. Working group 2 should identify paths forward, including by establishing new visa categories for personnel requiring specialized training for icebreaker construction.

Legislative and Regulatory Challenges

There are several legislative and regulatory hurdles that need to be addressed to fully and efficiently implement the ICE Pact, and to establish the groundwork needed to revitalize US shipbuilding and USCG readiness. Many cite Section 27 of the Merchant Marine Act of 1920, also known as the Jones Act, [67] as a challenge to ICE Pact, but it is not relevant to USCG' s icebreakers as it applies only to commercial vessels. The primary legislative hurdles are tied to Titles 14[68] and 10[69] of the United States Code, which limit the USCG's and armed forces' ability to construct ships and any "major component of the hull or superstructure of any such vessel," outside the United States.

Moreover, export controls, including regulations on the transfer of technology and design have been a persistent challenge. Specifically, reforming the International Traffic in Arms Regulations (ITAR) is a hurdle impacting AUKUS[70] and other minilateral programs. The US Ammunition List, a cornerstone of ITAR, outlines key defense-related articles that require strict export regulation. Icebreakers fall under Category VI —Surface Vessels of War and Special Naval Equipment.[71] Canada has similar issues with regulation and procurement processes. Finland's maritime sector follows a different model as it is run by the private sector with a strongly developed shipbuilding industry. This presents some complications for technology cooperation and export licenses from the US perspective. However, private-sector involvement can also foster innovation, which is especially relevant for working group 4.

To address Titles 10 and 14, the US president may grant exceptions, if they align with US national security interests. Press reports on April 18[72] suggest that this may indeed be the approach the United States is pursuing as the USCG looks to fill orders for three to five Arctic security cutters and three Polar class icebreakers. Additionally, a more permanent fix to this issue could follow the lines of Senator Lisa Murkowski's (R-Alaska) bill amending Title 14's exceptions[73] and Senator Mike Lee's (R-Utah) bill amending Title 10's exceptions.[74] If passed, these would be significant improvements to facilitating ICE Pact cooperation.

The US government is actively reviewing its export control regulations for the ICE Pact and other minilateral agreements such as AUKUS. Canada is beginning a review of its defense industrial policy that will also examine the country's export control regime for steps to address their offset policies[75] and other export controls that could hinder deeper cooperation.

Conclusion

As this report has outlined, cooperation with international and industry partners can help the United States fill capability gaps in a cost-effective and efficient manner. Existing partnerships and cooperative formats with Canada and other Five Eyes partners, and trusted international partnerships that can build on long-standing defense industrial cooperation and intelligence sharing, provide ideal opportunities for collaboration. But the United States should also consider deepening cooperation with other allies and partners with shared interests. To fill Arctic capability gaps, Washington should look especially to allies in Northern Europe. Space cooperation lends itself to cooperation with a broader set of partners. Collaborating with allies in areas of mutual interest can strengthen partnerships and save US resources in an expensive field.

The previous chapters have shown that the Unites States has many mechanisms and formats it can leverage to deepen joint capability design, production, and procurement with international partners. But many of these formats are impacted by technical and legal hurdles that are difficult to navigate and, as a result, they have not been used to their full potential. Political leadership in the executive and legislative branches can help overcome these hurdles and send necessary demand signals to industry. High-level political attention is especially critical to advancing strategic priority areas that have suffered from underinvestment, including icebreakers and Arctic capabilities more broadly. With this in mind, the United States should consider several steps to achieve optimal outcomes.

Use Strategy to Drive a Whole-of-Government Approach and Public-Private Ecosystem

Strategy documents play a critical role in setting goals and guideposts to inform all government branches and the defense procurement and development system, while incentivizing commercial partners. Strategy should consider the views of officials and officers on the ground as well as industry representatives, all of whom understand the requirements of their commands, regions, industrial sectors, or domains. As other experts have suggested, the United States should, for instance, consider developing a National Shipbuilding Strategy.[76] The ICE Pact can help drive a whole-of-government and minilateral approach to set Arctic capability priorities and requirements.

At a time when adversaries deepen military-civil fusion to advance their dual-use capabilities, the United States and its allies should also strive to maximize the potential of their commercial industry and minimize government compartmentalization and public-private silos via strategy and implementation. The ASBM and the ICE Pact have the capacity to help achieve the Trump administrations' goal of leveraging commercial partners and expanding US industrial capacity.

The United States should also take a more holistic approach to global threats and theaters, which are deeply interconnected. Continued updates to the Unified Command Plan are critical to addressing growing cooperation among Russia, China, Iran, and North Korea. Regarding the Arctic, more integrated planning across USNORTHCOM, USEUCOM, and USINDOPACOM remains critical, especially to address growing Russia-China alignment.

Find Flexible Approaches to Integrate International Partners into the Acquisition System

Where possible, the United States should try to inject more flexibility for international partnerships and suppliers into the US acquisition system. While the United States has the competitive edge in many areas of the defense industry, it can learn from international and commercial partners' experience in different specialty segments and in workforce development.

Cooperation with Arctic NATO allies will allow the US and those allies to maintain security and stability in a region defined by strategic competition. Space cooperation will be critical in facilitating Arctic domain awareness and communications necessary to support operations in the theater.

ICE Pact has the potential to solve the US icebreaker gap that poses a serious challenge to US (dual-use) capacity to operate in the Arctic: to support security, environmental, and economic interests. If used right, the pact can also advance US shipbuilding more broadly. Foreign experts from trusted partner countries, including Finland and Canada, could support US shipyard and shipbuilding modernization and development of a skilled workforce. This will require a reassessment of visa regimes, export controls, and procurement rules.

Arctic and space capabilities have specific demands, and investment in highly specialized and bespoke capabilities will remain important in some areas. Where possible, the United States and its international partners should minimize optional customization of assets that prolongs production timelines. Using cost-effective, off-the-shelf solutions can help plug urgent capability gaps in some cases. When designing new capabilities, compatibility should be prioritized from the start.

Given its broad scope and high-level political support and oversight, the ICE Pact has the potential to serve as driver and umbrella for joint Arctic capability development beyond its narrow icebreaker focus. It can also serve as an incubator to advance cutting-edge technologies with Arctic applications. As AUKUS has, the ICE Pact can serve as a tool to identify obstacles and optimize mechanisms, technical, and legal processes to develop, build, and field capabilities jointly with allies. Beyond presidential waivers, a close assessment of ITAR and US Code requirements can benefit future cooperative efforts.

Optimize Information Sharing and Interoperability

Efforts to integrate international and commercial partners should include a more nuanced approach to classification levels and information sharing. Compatibility of classified conferencing and messaging networks should be prioritized when new systems are put in place.[77] Trained foreign information dissemination policy experts embedded in operational commands, task forces, and operational centers could help organizations share information appropriately with allies and help align standards, technologies, and processes.[78] Information sharing on best practices within organizations can also help address cultural issues that impede innovation and opportunities for collaboration in a risk-averse security community.

Achieving interoperability among allied space systems is critical for deeper space collaboration. Satellite networks and ground infrastructure should be built with international partner requirements in mind. Developing scalable solutions that can be offered to international partners will allow commercial providers to remain competitive.

More broadly, the United States should continue creating, maintaining, and deepening forums that allow international and industry partners to gather regularly to identify shared interests and challenges, and facilitate cross-sector innovation. The capability initiatives outlined in this report demonstrate the importance of inadvertent and deliberate collaboration. Connecting the right people and breaking silos can pave the way for out-of-the box thinking that facilitates innovative solutions. DoD should also continue inviting key international and commercial partners to exercises and training, including in the Arctic and in the space domain, to optimize interoperability, identify operational obstacles and shortfalls, and test new technologies and capabilities. DoD's premier field exercise, "Arctic Edge", which includes key international partners and tests promising new capabilities, is a prime example that should be replicated and scaled up.

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