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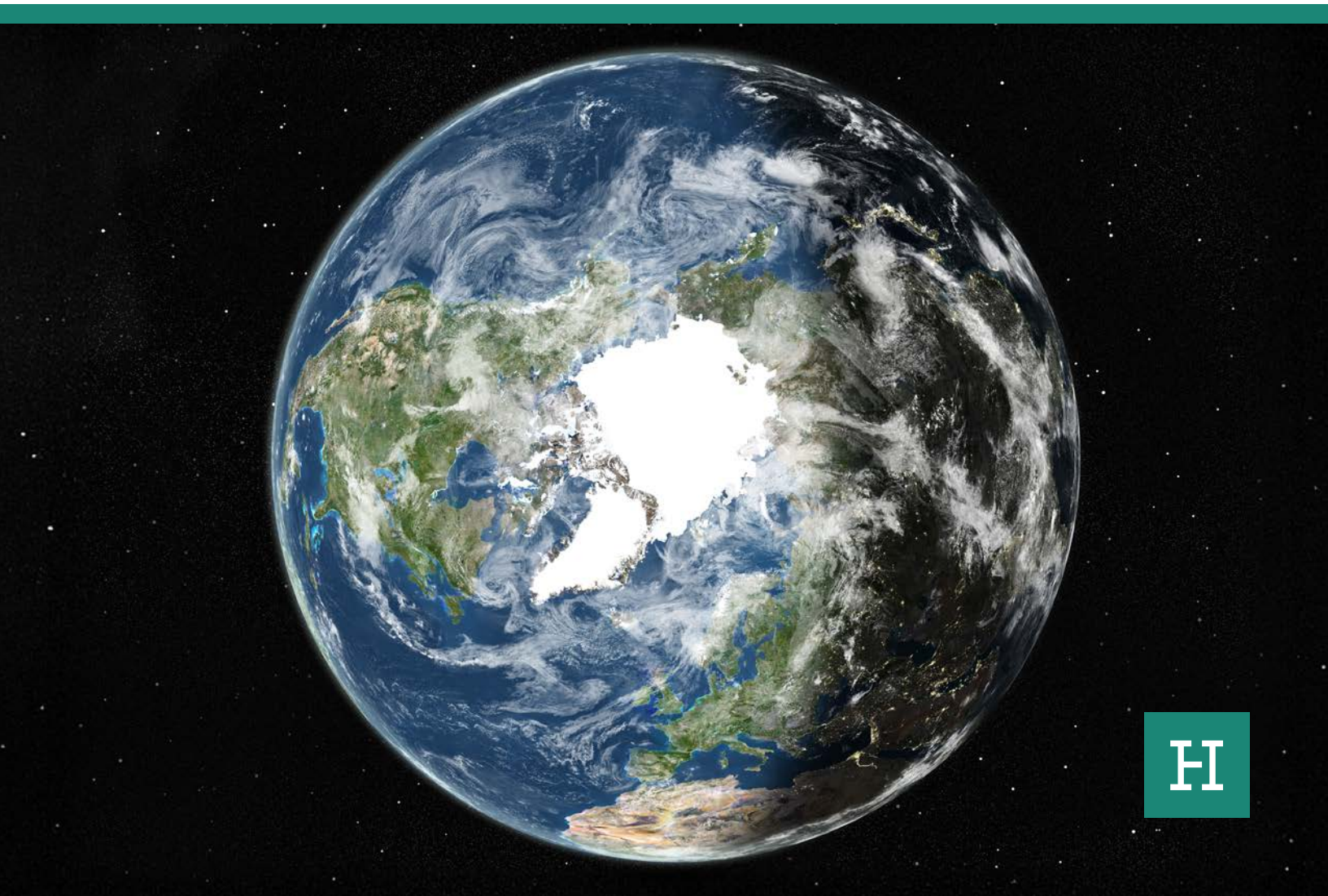
Closing the Arctic Gaps: NATO Allies and Partners Can Protect Their Homelands by Updating Their Defense Force Postures

LISELOTTE ODGAARD, SENIOR FELLOW, HUDSON INSTITUTE
CONTRIBUTIONS: DAVID BYRD, BRYAN CLARK, SHANE DENNIN, ZANE RIVERS, AND TIMOTHY A. WALTON



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Cover: True color satellite image shows Earth centered on the North Pole with cloud coverage during summer solstice at 6:00 p.m GMT on October 21, 2002. (Planet Observer/Universal Images Group via Getty Images)

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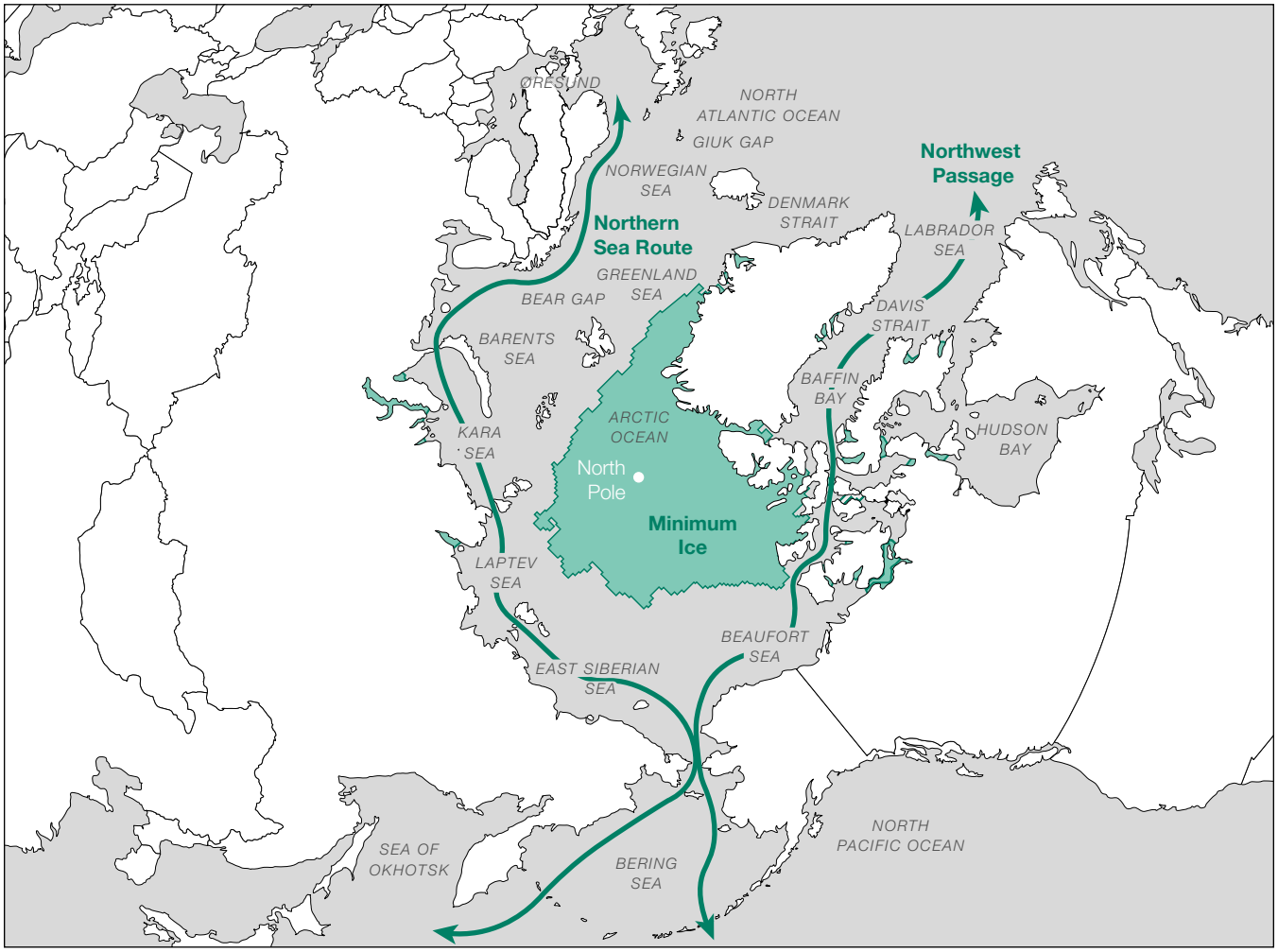
TABLE OF CONTENTS

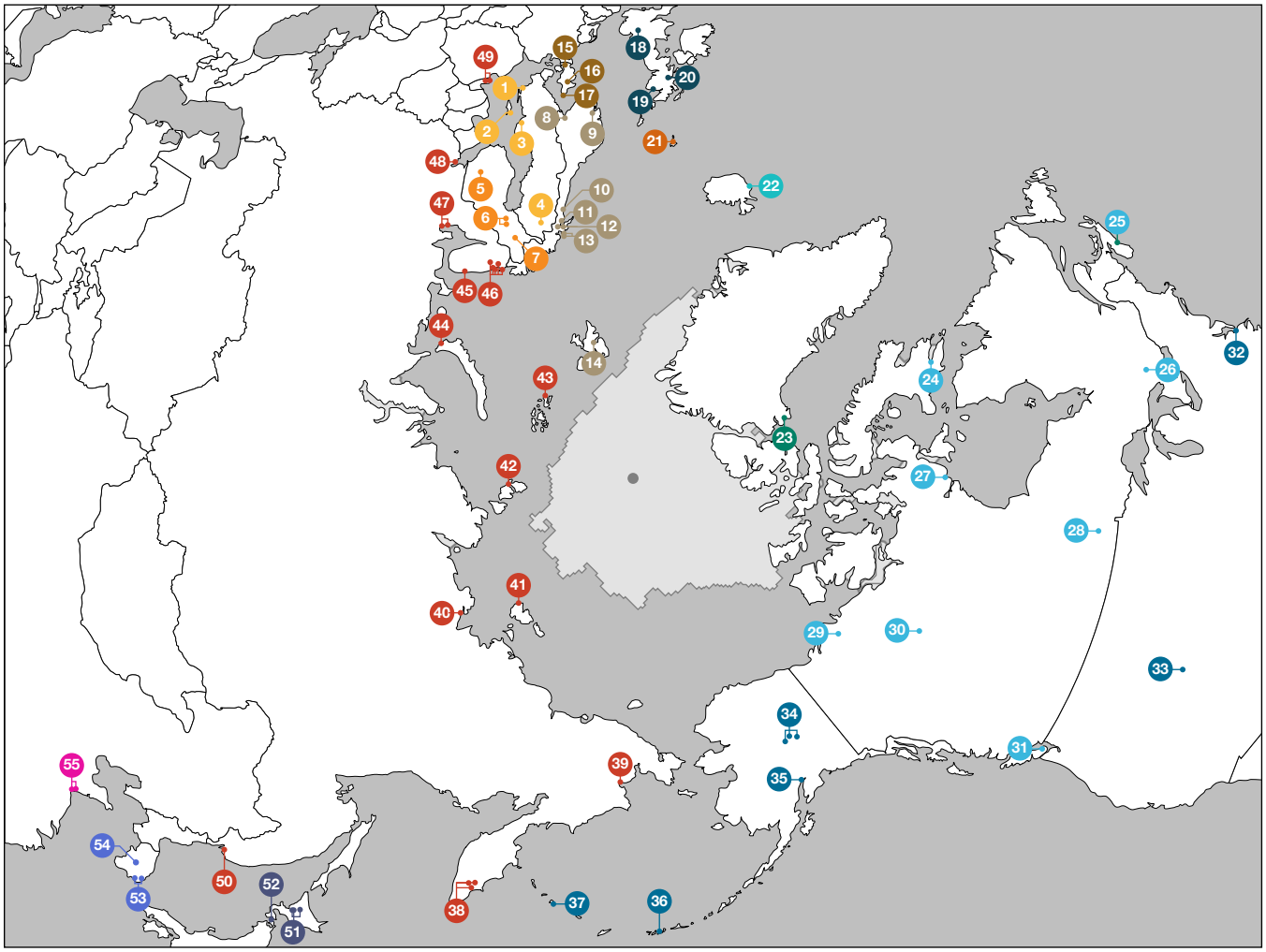
Map 1. The Arctic Region



Source: Author, with sea ice data from "2025 Arctic Sea Ice Minimum Squeezes into the Ten Lowest Minimums," National Snow and Ice Data Center, September 17, 2025, https://nsidc.org/sea-ice-today/analyses/2025-arctic-sea-ice-minimum-squeezes-ten-lowest-minimums.

Note: Minimum sea ice is based on the sea ice extent on September 10, 2025.

Map 2. Bases and Other Locations Relevant to the Arctic Region



Source: Author.

Sweden

1. Karlskrona Naval Base
2. Gotland Regiment (P18)
3. Muskö Naval Base
4. Esrange Space Center

Finland

5. Finnish Army Command Headquarters (Mikkeli)
6. Rovaniemi Defense Properties
   Rovajärvi Artillery Practice Range
7. Sodankylä Defense Properties

Norway

8. Rygge Air Force Base
9. Sola Air Station
10. Bodø Air Station
11. Port of Narvik
12. Evenes Air Station
    Ramsund Naval Station
13. Andøya Air Station
    Andøya Space Center
14. Svalbard Satellite Station

Denmark

15. Fighter Wing Skrydstrup
16. Air Base Karup
17. Aalborg Air Base

United Kingdom

18. Northwood Headquarters
19. RAF Lossiemouth
20. HMNB Clyde

Greenland, Iceland, and the Faroe Islands

21. Sornfelli Radar Station
22. Keflavík Air Base
23. Pituffik Space Base

Canada

24. CANR FOL Iqaluit
25. CFB Halifax
26. CFB North Bay
27. CANR FOL Rankin Inlet
28. CFB Winnipeg
29. CANR FOL Inuvik
30. CANR FOL Yellowknife
31. CFB Esquimalt

United States

32. Joint Force Command Norfolk (NATO HQ)
33. Peterson Space Force Base (NORAD HQ)
34. Fort Greely
    Eielson Air Force Base
    Clear Space Force Station
35. Joint Base Elmendorf–Richardson
36. Adak Island
37. Eareckson Air Station

Russia

38. Vilyuchinsk
    Rybachii Submarine Base
    Petropavlovsk-Kamchatskiy
39. Anadyr Airport
40. Tiksi Aerodrome
41. Temp Air Base
42. Sredny Ostrov Airfield
43. Nagurskoye Air Base
44. Rogachevo Air Base
45. Gremikha Naval Base
46. Polyarny Naval Base
    Severomorsk (Northern Fleet HQ)
    Zapadnaya Litsa Submarine Base
    Skalisty Submarine Base
    Olenya Guba Naval Base
47. Severodvinsk (Sevmash Shipyard)
    Port of Arkhangelsk
48. Port of Kronstadt
49. Kaliningrad (Baltic Fleet HQ)
    Port of Baltiysk
50. Fokino (Pacific Fleet HQ)

Japan

51. JASDF Chitose Air Base
    JGSDF Camp Higashi-Chitose
    JGSDF Camp Asahikawa
52. JMSDF Ōminato District Headquarters

South Korea

53. Commander Fleet Activities Chinhae
    Busan Naval Base
54. US Army Garrison Daegu

China

55. Jianggezhuang Naval Base
    Yuchi Naval Base

Note: CANR FOL = Canadian NORAD Region Forward Operating Location; CFB = Canadian Force Base; HMNB = His Majesty's Naval Base; JASDF = Japan Air Self-Defense Force; JGSDF = Japan Ground Self-Defense Force; JMSDF = Japan Maritime Self-Defense Force; NORAD = North American Aerospace Defense Command; RAF = Royal Air Force.

EXECUTIVE SUMMARY

Despite the war in Ukraine, Russia has not scaled down its commitment to develop its Arctic region from the Barents Sea to the Bering Strait. As analyzed in earlier publications, the Northern Sea Route connects Russia to China, encouraging the two countries to cooperate on developing the energy and shipping potential of Russia's Arctic coastline. The route also allows them to expand military-strategic collaboration to benefit their economies while posing a hard power threat to the United States and its allies.[1]

In the Barents Sea near the North Atlantic Treaty Organization (NATO) area of operation, China plays a dual-use role in facilitating Russia's ability to pose a hard-power threat to the US and its allies in northern Europe. Beijing has avoided opening another flank toward the US alliance system in a region China does not prioritize, but Moscow has designed its force posture to protect its nuclear threat against the US and its regional allies. This priority includes coordinating naval operations in the Barents and Norwegian Seas and the Greenland–Iceland–United Kingdom (GIUK) Gap with its Baltic Sea operations, resulting in the strategic merging of the Arctic and Baltic Sea regions. Russia and China are strengthening their military cooperation across the Bering Sea region and the North Pacific, which merges the two regions strategically. As a result, Japan and South Korea have greater interests in the Arctic.

This report argues that Russia's China-enabled threat presents a homeland security concern to all of the US's NATO allies in the Arctic and to its Japanese and South Korean allies in the North Pacific. However, the United States is the only Arctic nation

Photo: The *Arleigh Burke*–class guided-missile destroyer USS Bainbridge transits the North Cape fjord in the Barents Sea above the Arctic Circle on August 29, 2025. (US Navy)

whose interests span the entire Arctic region. This vast, sparsely populated area features extreme weather conditions. The US and its allies have few polar-capable capabilities and need to develop them as military-strategic threats grow in complexity. The US is in a strategic position to coordinate joint operational planning and acquisition plans to ensure that deterrence is effective across the Arctic and that its allies could defend themselves in full-scale warfare.

America's missile defenses, uncrewed systems, and submarine forces are central to deterring aggression in the Arctic and defending it if deterrence fails. However, the US military faces numerous demands across the world, so it will have to operate in conjunction with allies during all phases of Arctic warfare and in multiple theaters. In particular, US submarine forces will be in high demand, so allies will need to contribute similar capacities in the Arctic rather than rely on the United States.

Meanwhile, Russia poses the following threats in the Arctic:

- A credible nuclear threat against the US homeland and allies, taking advantage of low visibility and insufficient surveillance of Arctic airspace and waters
- Expansion of successful submarine operation areas in the Barents and Norwegian Seas and the GIUK Gap
- Stronger patrolling and defense of areas with contested claims in the Arctic Ocean
- Coordinated naval operations for the Arctic and Baltic Sea regions
- Development of joint hybrid and military operational concepts with China for the Arctic and the North Pacific regions

Therefore, a concept of operations needs to accomplish several tasks:

- Deter Russia and China's gradual expansion of their military-strategic operations
- Provide domain awareness across the Arctic region
- Increase the resilience of critical allied civilian and military infrastructure and capabilities
- Create an interoperability across northern Europe and the North Pacific that integrates the Baltic and Barents Sea regions and the North Pacific and Bering Sea regions
- Maintain freedom of navigation through commercial and coast guard operations where this principle is challenged

The report concludes with these recommendations:

- The allies need to mitigate the nuclear threat with additional early warning, tracking, and interception capabilities in eastern Greenland; a more robust satellite intelligence, surveillance, and reconnaissance (ISR) and targeting infrastructure; and more redundancy in allied space capabilities across the North Atlantic. Such efforts would strengthen multi-domain awareness and increase infrastructure resilience, and Denmark, Norway, Japan, and South Korea would be useful partners for these programs.
- Allied forces should develop uncrewed systems to penetrate Russia's bastion defenses and prevent its submarines from exiting. These systems should be stationed close to the Barents Sea and the Sea of Okhotsk to raise Moscow's cost of trying to expand its submarines' area of operation. In the short term, exercises near Russian submarine bases and in its exclusive economic zone would deter Russia and put it on the defensive. Norway, the UK, and Japan can build these antisubmarine forces.
- The allies should field a denser and more reliable network of monitoring capabilities—such as ice-hardened patrol and antisubmarine vessels, underwater sensor networks, and uncrewed underwater vehicles—to close ISR gaps across the Arctic and adjacent regions and to strengthen maritime domain awareness and infrastructure resilience. Canada, Denmark, Japan, and South Korea would be key in this effort.

- The US, Canada, and Denmark should use commercial and military assets to conduct icebreaker patrols in the Arctic Ocean and along Canada's Northwest Passage. These operations would mitigate Russian patrolling of areas with competing claims, demonstrate the allies' presence in remote areas, and enhance maritime domain awareness. Patrolling would also defend freedom of navigation rights in disputed waters.
- The US and its allies should integrate Arctic, Baltic, and North Pacific naval warfare operations into two joint coordinated force postures to strengthen interoperability and deterrence. This effort would counter Russian and Russian-Chinese operational plans by coupling the Arctic with the two theaters. Finland, Sweden, and Denmark would be key in the Baltic, and Canada, South Korea, and Japan would help in the North Pacific.
- South Korea's polar-capable port and shipbuilding infrastructure can establish a dual-use presence from the North Pacific and along the Northern Sea Route. This would improve maritime domain awareness and defend freedom of navigation rights in an area where Russia and China are increasing their hybrid and military activities.

1. RUSSIA'S CHINA-ENABLED ARCTIC FORCE POSTURE THREATENS US ALLIES

The United States, Iceland, Norway, Finland, Sweden, the Kingdom of Denmark (including Greenland and the Faroe Islands), the United Kingdom, and Canada together make up the northern flank of the North Atlantic Treaty Organization (NATO). Since Finland and Sweden joined the alliance in 2023 and 2024, respectively, it has strengthened defense cooperation and integration between the US and its North Atlantic allies with stakes in Arctic security.[2] In addition, NATO's Indo-Pacific partners Japan and South Korea are slowly but surely integrating into the network of allies with Arctic defense interests due to their proximity to the region's Bering Sea entrance. Nevertheless, NATO's Arctic allies are ill-prepared for security challenges here.

Russia has spent the past decade building up its defense force posture in the Arctic with assistance from China (see table 1). As strategic competition heats up, the US alliance system may be unprepared to credibly counter military challenges from Moscow and Beijing. One concern is that Russia is seeking to expand its submarine operations to maintain credible targeting of the US homeland with submarine-launched nuclear weapons. The US and Canada are upgrading their missile defenses, but these are

Photo: The new *Borei*-class nuclear-powered ballistic submarine *Imperator Aleksandr III* is seen during a flag-raising ceremony led by Vladimir Putin at the Arctic port of Severodvinsk on December 11, 2023. (Getty Images)

Table 1. Capabilities of Adversaries and Allies

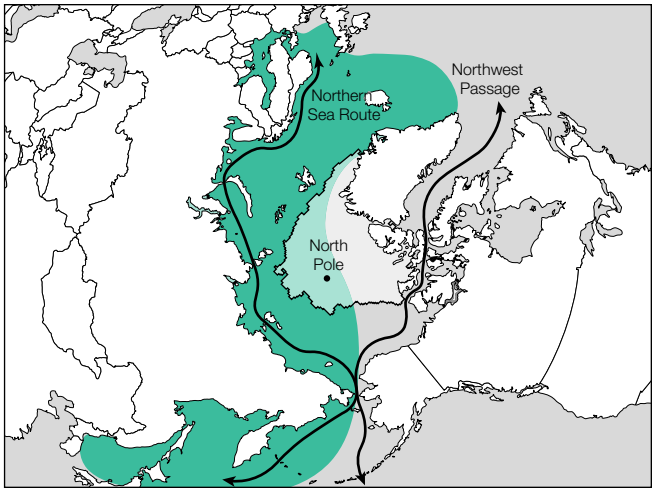
CHINA-ENABLED THREATS FROM RUSSIA	US AND ALLIED RESPONSE CAPABILITIES	US AND ALLIED RESPONSE CAPABILITIES GAPS
Nuclear threat from strategic land- and sea-based ballistic missiles	Ballistic missile defense (NORAD cooperation with Canada; Pituffik Space Base in Greenland); Norway's Andøya Space Center; allied maritime patrol aircraft, ASW frigates and submarines	Radar coverage; satellite communications; undersea monitoring systems and submarines; redundancy in space capabilities
Hybrid and military operations to expand area of submarine operations involving ISR and surface vessels with long-range missiles for attacking ships, aircraft, and small submarines	Submarines (US, UK, Norway); ISR, air defense, and ASW frigates; coastguard vessels; fighter aircraft	Polar-capable uncrewed systems; ice-strengthened ISR and naval warfare frigates; submarines
Patrolling in areas of overlapping claims	Icebreakers (Canada, US, Norway)	Icebreakers and ice-strengthened multi-mission vessels; government-assisted commercial operators on Northwest Passage
Coordinated Russian hybrid and military operations merging the Arctic and Baltic theaters	Submarines (Sweden); mine warfare vessels (Finland); fighter jets (Sweden, Denmark, Finland); coastguard vessels and air defense and ASW frigates (Sweden, Denmark, Finland)	Fighter aircraft; air defense and ASW frigates; uncrewed aerial, surface, and underwater systems
Joint Russia-China hybrid and military operations merging the North Pacific and Arctic theaters	US-Canada coastguard and surface vessels, submarines, fighter jets, radar, and satellite communication assets	Interoperability with emerging South Korean commercial operators for presence and ISR, and with Japanese aerial and naval capabilities and uncrewed systems for ISR and counter-operations

Source: Author.

not yet foolproof against modern missile technology, such as hypersonic missiles. Adding insult to injury, visibility is low in the Arctic because extensive low-level cloud cover and fog reduce the visual range. Low visibility hampers allied surveillance of the airspace over Greenland and the North Pole, so Russia has a good chance of penetrating defenses successfully. Indeed, Moscow can pose a credible nuclear threat to the US because the allies do not have enough space-based systems for intelligence, surveillance, and reconnaissance (ISR) that can work with sea- and air-based surveillance capabilities across this vast region.

Moscow is attempting to expand the area where it can successfully conduct submarine operations, and this may produce hybrid challenges to allies such as Norway, Greenland, the Faroe Islands, Iceland, and the UK (see map 3). The key area is the transit route from Russia's submarine base on the Kola Peninsula to the GIUK Gap, which grants access to the Atlantic Ocean. These challenges may turn into military operations insofar as allies cannot successfully counter hybrid operations. For example, in August 2025 while operating in the Norwegian Sea with Norwegian and UK forces, the USS *Gerald R. Ford* carrier

Map 3. Russia's Arctic-Relevant Interests



Source: Author.

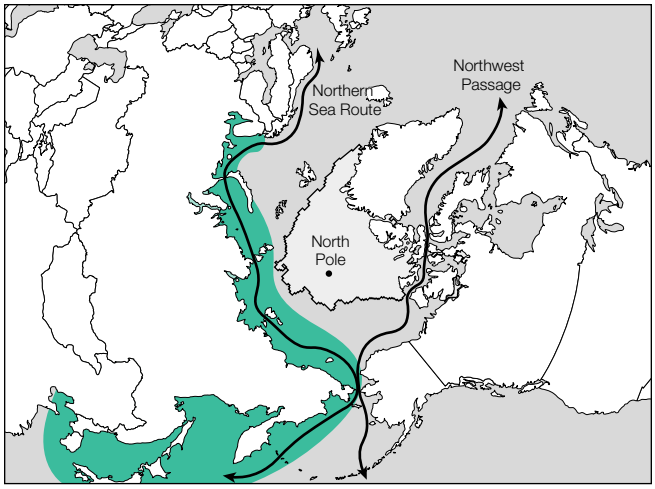
strike group had difficulties detecting Russian submarines that were challenging it.[3] The US, Norway, the UK, and Denmark do not have sufficient underwater capabilities for detecting, tracking, and engaging submarines. They also lack enough aircraft and surface vessels, including ice-hardened ships, for antisubmarine warfare (ASW) and air defense and for penetrating adversary defenses, such as Russia's bastion defense in the Barents Sea. At present, Russian nuclear-powered guided missile submarines (SSGNs) and fast-attack submarines (SSNs) have a good chance of reaching the Atlantic Ocean undetected where allies have trouble detecting them. If they approach the North American coastline and are equipped with nuclear-capable cruise missiles, they can credibly target the US homeland with nuclear attacks.

Russia claims the extended continental shelf, which Canada and Denmark dispute, particularly around the Lomonosov Ridge in the center of the Arctic Ocean. For that reason, Russia may decide to manifest its alleged rights to patrol and control the disputed areas. Yet none of the Arctic NATO allies have sufficient icebreakers, ice-hardened multimission vessels, and polar-capable uncrewed systems to monitor and respond to challenges in remote areas with multiyear ice.

Recent Russian challenges to the air defenses of NATO allies such as Denmark, Finland, and Sweden highlight that the Baltic and Arctic theaters are closely linked. Indeed, Russia drove this point home in 2024 when it dissolved the Northern Fleet and Western Military District and redistributed their ground and air military installations, forces, and capabilities between the new Moscow and Leningrad Military Districts.[4] If military conflict breaks out in either the Baltic or Arctic, Russia will engage in coordinated operations to secure sea control in both theaters. This highlights the need for joint operations not only in the Arctic but also in the Baltic Sea. As Baltic states, Sweden and Finland play leading roles in preventing Russia from entering this sea. If these efforts fail, Denmark is the next country in line to prevent a Russian exit to the North Sea. Yet because the allies have insufficient underwater, naval, and air defense capabilities, Russia may acquire control of the Baltic Sea region, including its entry and exit points.

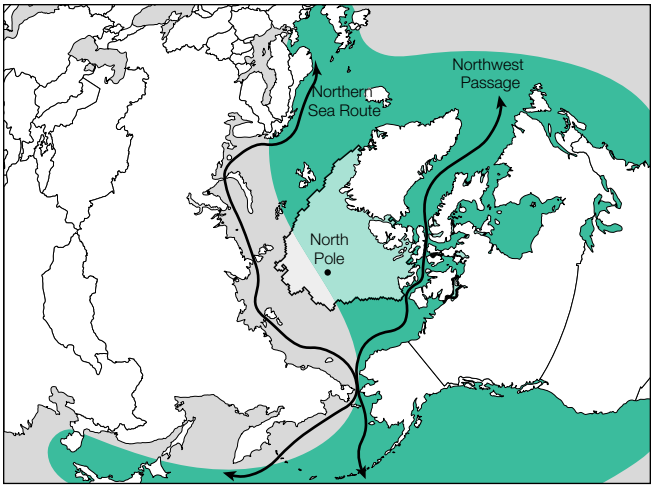
Finally, as sea ice melts and commercial and hybrid traffic along the Northern Sea Route increases, the chances that an incident leads to military conflict grow. Companies in China, Japan, and South Korea have decided to open container routes along the Northern Sea Route, and this development demonstrates that the North Pacific and Arctic theaters are merging, making Arctic security and defense a homeland security issue for Tokyo and Seoul. Russia-China joint operations traversing the North Pacific into the Bering Sea region also indicate that the regions are merging. These operations sometimes include strategic capacities such as long-range bombers. Russia-China joint naval patrols and bomber flights take place in Japanese and South Korean waters and airspace as well (for the range of China's interests in the region, see map 4). To provide early detection, tracking, and response, Japan and South Korea have a mutual interest with Arctic states like the US and Canada in integrating Arctic defense and deterrence plans.

Map 4. China's Arctic-Relevant Interests



Source: Author.

Map 5. US Arctic-Relevant Interests



Source: Author.

Since 2024, the Arctic has been at the top of the US security agenda because policymakers in Washington have recognized that homeland security is threatened if Arctic defense and deterrence are neglected. The US is the only NATO state whose strategic interests span the entire Arctic (see map 5), from the Barents Sea to the Bering Sea, due to the circumpolar Russian and Chinese nuclear threat to US homeland security. This makes the United States the best-equipped ally to coordinate allied defense and deterrence. The US can drive the point home for NATO and Indo-Pacific allies that their homeland security is threatened if they do not coordinate their operations and acquisitions for the Arctic region, especially as Russia exploits gaps in allied defenses and China gradually expands its interests and presence across the region.

Iceland, Norway, the UK, and Canada are the allies most integrated with the US Arctic defense force posture due to their geographic location and long-standing alliances with Washington. This makes them nodes in NATO's Arctic defense force posture. Finland, Sweden, and the Kingdom of Denmark are moderately integrated with the US Arctic defense force posture, primarily because their geographic location and defense industrial capabilities allow them to close the gaps in NATO's Arctic defenses and in the adjacent Baltic theater. Japan and South Korea are not integrated with the US Arctic defense force posture, but their geographic location as well as their defense and dual-use capacities make them desirable partners. To effectively close existing defense gaps, the allies need a plan that is based on existing allied strengths and capacities to credibly deter Russian and Chinese actual and potential challenges to homeland security.

Instead of reacting to Russian and Chinese challenges, NATO allies and their partners need a concept of operations that creates security dilemmas for Moscow and Beijing and makes the costs of undertaking military operations too high. Such a concept should force Russia and China to go on the defensive. For example, the allies could demonstrate that they can damage opponents' key assets at home bases. The current approach has not worked. A forward presence and defensive operations to protect allied key assets have proven to be insufficient for deterrence purposes, so the allies should establish a more

offensive defense force posture closer to opponents' critical assets. A new operational concept cannot wait for the US and its allies to build next-generation capacities. Implementation should start now by using existing capabilities differently. This would allow the allies to gradually integrate planned acquisitions once they are ready for deployment over the course of the next decade.

The next chapter outlines the Arctic security environment. Principally, China has enabled Russia to threaten the territory and maritime space of the US and its allies in northern Europe and in the North Pacific, as well as threaten freedom of navigation and overflight. Chapter 3 describes a concept of operations that can both defend and deter in the short and long term, raising opponents' costs of offensive operations. Chapter 4 assesses the contributions of NATO's Arctic allies and partner countries to Arctic defense and deterrence. It describes an allied defense force posture that trails behind the opponents because it is primarily built around defending rather than deterring. The chapter then explains how redefining the existing force posture can remedy this problem, and how acquisitions and development projects will allow allied forces to gradually build a robust offensive defense force posture. The report concludes by discussing which gaps remain in NATO's Arctic defense force posture and offers recommendations for how the allies can fill these gaps in the short and long term.

2. ARCTIC SECURITY AMID US-RUSSIA-CHINA STRATEGIC COMPETITION

Tensions in the Arctic security environment have shifted from low to high within half a decade. Russia invaded Ukraine in 2022, and its defense presence is growing in countries such as Georgia, Moldova, and Belarus. Moscow has also introduced hybrid warfare in both the Baltic and Arctic regions, conducting cyberattacks, carrying out disinformation campaigns, and damaging submarine cables. These activities are destabilizing societies, and they demonstrate Moscow's determination to reestablish a security buffer along its continental and maritime border with NATO and to rebalance European security loyalties in its favor. Its status as a NATO adversary will almost certainly endure, incentivizing Moscow to redirect its economy away from Europe and North America and toward Asia and the Global South.[5]

Russia's Arctic Defense Force Posture

Russia has militarized the Arctic region in earnest since 2014. In 2024, the Arctic accounted for 7.5 percent of the country's gross domestic product (GDP). In comparison, Alaska accounts for 0.3 percent of US GDP.[6] These figures reveal why Russia would want to develop its Arctic maritime waterway, the Northern Sea Route, which skirts its northern coast between Murmansk in the west and Provideniya in the east.[7] Russia's Arctic region is rich in minerals, hydrocarbons, and fish. Moscow has designed its defense force posture here to protect its ballistic

Photo: China's research icebreakers *Xue Long* and *Xue Long 2* carry out icebreaking operations surrounding Zhongshan Station, a Chinese research base in Antarctica, on November 29, 2024. (Getty Images)

Table 2. Submarines in Operation

	BALLISTIC MISSILE	NUCLEAR ATTACK	NUCLEAR CRUISE MISSILE	DIESEL-ELECTRIC ATTACK	ATTACK AIR-INDEPENDENT PROPULSION
Russia	16	14	11	23	
China	6	6		27	21
United States	14	50	4		
Canada				4	
United Kingdom	4	5			
Norway				6	
Sweden					5
South Korea	6 (AIP-enabled)			9	6
Japan					24

Source: Author.

missile submarines (SSBNs); in addition to its land-based intercontinental and mobile ballistic missile forces, these vessels give it a second-strike nuclear capability and hence a credible threat to US territory.[8] Most of Russia's SSBN and SSGN force is located with the Northern Fleet on the Kola Peninsula near the Norwegian border and with the Pacific Fleet on the Kamchatka Peninsula in the North Pacific. In 2023, Russia launched its latest SSGN, the Yasen-class *Arkhangelsk*, which carries hypersonic cruise missiles and anti-ship missiles. Submarines of this class are deployed with the Northern Fleet.[9]

Admiral Aleksandr Moiseev, the top commander of the Russian navy, considers the Arctic a key region where a confrontation of the world's leading states is unfolding. Considering the Arctic a front line in a strategic competition, Moscow has launched operations such as the 2025 exercise July Storm, which Admiral Moiseev headed. Half of the area in which the five-day exercise took place was in Russia's exclusive economic zone (EEZ), and the other half was in Norway's EEZ in the Barents Sea.[10]

The Barents Sea constitutes the entry and exit points to the Kola Peninsula from the Northern Sea Route. With support from a dense network of air defense, aviation, and ground forces at its Northern Fleet bases, Russia has focused on being able to close off access as traffic increases on the sea route, both to protect its strategic submarine force and to preserve year-round access to the Atlantic. It has modernized the Nagurskoye airfield on the Franz Josef Land Archipelago, deployed multiple surface-to-air missiles and radar units, and authorized command-

Table 3. Icebreakers in Operation (2025)

	RUSSIA (ESTIMATE)	CHINA	UNITED STATES	CANADA	UNITED KINGDOM	NORWAY	KINGDOM OF DENMARK	SOUTH KOREA	JAPAN
Heavy	8	3	1	2					
Medium	15	5	2	17	1	1		1	1
Light	20		2	1		1	3		

Source: Author.

ers to plan and carry out interception operations. Russia has turned its Novaya Zemlya Archipelago, which is between the Barents and Kara Seas, into an Arctic air and missile defense dome that forms the groundwork of an anti-access/area-denial (A2/AD) regional network. These capabilities enhance Russia's multidomain awareness and power projection capability and consolidate a bastion strategy for protecting its ballistic missile submarines.[11] Meanwhile, Russia is expanding its current fleet of 16 SSBNs, 11 SSGNs, and 37 attack submarines. (see table 2).[12] It has also invested heavily in precision-guided missile technology, enabling it to threaten distant targets and achieve sea denial without deploying traditional naval or air forces. In addition, it has expanded its patrolling and surveillance program and its icebreaker fleet, with combat icebreakers in the pipeline. Currently, Russia operates eight heavy nuclear icebreakers among a total of 43 icebreakers (see table 3).

Russia has headquartered its Pacific Fleet and hardened its submarine bases in the Vladivostok area south of the Bering Strait entrance to its Arctic coastline. There it has increased missile and torpedo stocks and constructed new hardened submarine shelter pens and repair and maintenance facilities. These help it avoid depending on Northern Fleet facilities at the other end of Eurasia.[13] The Sea of Okhotsk is a fortified area that can protect the Pacific Fleet's SSBNs and SSGNs, which today are nearing the size and quality of those in the Northern Fleet. Russia has now deployed special-mission nuclear *Belgorod* submarines of the Oscar II–class with Poseidon nuclear-powered uncrewed underwater systems at Kamchatka and at the Kola Peninsula.[14]

China in the Arctic

China is a critical enabler of Russia's force posture across the Arctic, contributing the financial and technological muscle that allows Russia to establish a credible deterrent against NATO allies and its partners.

In the eastern Arctic region, China and Russia conduct joint operations, such as joint strategic bomber patrols and joint China Coast Guard and Russian Border Service patrols, in and near US waters and airspace. They have also established base-sharing arrangements below the Bering Sea entrance to the Arctic at the Sea of Okhotsk.

In the western Arctic, Beijing prefers that Russia pose a hard-power threat to the US and its allies rather than establishing a military presence of its own, which would require major resources and attention. China is engaged in plenty of other hotspots that are more immediate concerns for its own interests, such as the Taiwan Strait, the Korean Peninsula, the South and East China Seas, Central and South Asia, and the South

Pacific. Consequently, Russia-China cooperation is mainly dual-use. For example, in September 2025, China-controlled container line Sea Legend launched the first direct shipping path via the Northern Sea Route.[15] The container route is commercial but will allow China to conduct ISR operations and transport military cargo across the Arctic. Russia's state corporation Rosatom and China's NewNew Shipping are also building five ice-class container ships for year-round operation on the Northern Sea Route from 2030. This project indicates the mounting hybrid challenges stemming from the two countries' economic and strategic cooperation.[16]

In addition to cooperating on shipping along the Northern Sea Route, Russia and China are building an extensive seabed-to-space sensor network. This will challenge the ability of US and allied submarines to remain undetected.[17]

Furthermore, China's presence is slowly spreading across the Arctic as it strengthens its military cooperation with Russia. In September 2024, China participated in Russia's Ocean-2024 naval exercise with four warships and 15 aircraft, and the two countries held the joint naval and air exercise Northern/Interaction-2024 (or North-Joint 2024), during which the Chinese military participated in operations at the Bering Sea end of the Arctic and in the Sea of Japan. Such Russia-China exercises have focused on ASW, air defense, anti–uncrewed aerial system operations, and anti-sea drone warfare.[18]

While working closely with Russia to secure its economic and strategic interests in the Arctic, China acquires capabilities and establishes a foothold so that it can operate independently across the region and build a military presence in case its priorities change. At present, Beijing operates three heavy domestically built icebreakers and has capacities such as semisubmersible ships for salvage operations, polar satellites, and a wide range of drones, including uncrewed underwater vehicles. So China can operate across the Arctic, provided it has access to repair and replenishment facilities at Russia's Arctic ports.[19] Because of China's strategic engagement with Russia and its long-term Arctic interests, the US and its allies need to consider Chinese actions and interests when designing their defense concepts and plans for deterrence.

3. OFFENSIVE OPERATIONS ARE A NECESSARY PART OF ARCTIC DEFENSE AND DETERRENCE

At present, Russia and China can conduct offensive operations that threaten allied security. For example, they can successfully break through allied antisubmarine defenses, expand areas of dual-use operations into allied areas, hold exercises in allied EEZs, conduct joint operations involving strategic capacities such as bombers near key military infrastructure, and deploy forces such as nuclear submarines with uncrewed systems for ASW near allied forces. These numerous offensive challenges indicate that US and allied deterrence is not working. Russia and China are expanding their area of operation by ensuring that encounters with allied forces take place away from their operational centers and key capabilities.

To provide credible deterrence, the US and its Arctic allies should mirror Russian and Chinese offensive operations, putting the ball in their court. Allied offensive operations taking place in the vicinity of command-and-control (C2) centers and main bases will help convince the enemy that military escalation risks triggering a war that would deprive them of the main capabilities they need to win a conflict. In the Arctic, the allies would rely on existing capabilities in the short term. For example, these

Photo: A NORAD F-16 Fighting Falcon fighter aircraft from the South Carolina Air National Guard lands at Pituffik Space Force Base in Greenland on October 7, 2025. (US Air Force)

operations could focus on joint exercises near adversarial bases and fortifications, including in Russia's EEZs near its submarine bases by the Barents Sea or the Sea of Okhotsk. In the long term—as additional submarines are built, polar-capable uncrewed systems for undersea warfare become available, and other capabilities come online—permanent forces can be stationed near Russia's submarine bases. These would signal an immediate allied response to aggressive Russian actions.

The US and its allies cannot rely on only these types of operations to deter Russia and China. To be effective, they will need to coordinate such efforts with other operations. Domain awareness is a precondition of deterrence and defense, and this requires surveillance operations to detect commercial and military activities that may indicate adversary plans and developments. In the short term, the allies can use existing capabilities to strengthen maritime and aerial patrolling, with a focus on the eastern Greenland Sea, Norwegian Seas, and North Pacific, including the area near the Sea of Okhotsk. Using ASW capabilities and frequent allied submarine activity in those areas can stress Russian submarines and discourage them from challenging allied operations. In the long term, the allies will need to strengthen radar and satellite coverage and undersea monitoring systems to close surveillance gaps. They should also acquire additional submarines to strengthen monitoring efforts and increase their options for responding to threats in areas that are difficult to access. In order to respond to missile attacks, they will need to continuously upgrade their space-based monitoring capabilities across the airspace of North America, Greenland, the Norwegian Sea, and the North Pole. Once they become operational over the next decade, polar-capable uncrewed systems will also be key to surveilling the region.

Resilience is another precondition of deterrence. Without it, the cost of deterrence may rise significantly. Therefore, the allies will need to protect their critical civilian and military infrastructure and capabilities and have enough redundancy so that they can replace assets lost in battle. To protect critical infrastructure in the short term, submarines, coast guard vessels, frigates, surveillance and fighter aircraft, and space-based surveillance assets are essential for monitoring and responding to threats. In the long term, the allies should build redundancy by relying on affordable polar-capable uncrewed systems to monitor critical infrastructure. Moreover, redundancy in military space capabilities will (a) allow core European allies to operate independently from the United States, (b) help provide timely monitoring and response options, and (c) sustain the allies' ability to protect critical infrastructure in the event of war.

Allied forces will need to be interoperable to carry out any operations in the vast Arctic region, where an extreme climate and environment challenge capabilities. Arctic allies are too few and face too many challenges to counter adversarial behavior on their own. In the short term, exercises not only have a deterrent effect but are also a main instrument to ensure interoperability. So allied powers should expand their areas of operation so that they are accustomed to operating in environments outside their immediate neighborhood. This will help to deter Russia and China from attempting to expand their areas of military operations and demonstrate that the US and its allies can operate across the Arctic in the event of a two-front war encompassing several theaters. These joint operations should also include coordinated exercises in the Arctic and Baltic theaters, as Russia is merging them in its operations.

To further improve interoperability, the US should encourage the inclusion of Japan and South Korea in exercises as joint Russia-China operations are merging the Arctic and North Pacific theaters. European forces should participate in exercises near Russia's bastion defense by the Sea of Okhotsk, and Canadian and Asian allied forces should participate in transatlantic exercises near Russia's Barents Sea bastion defense. Such exercises would require demand signals from the US that Euro-Atlantic and Indo-Pacific cooperation on exercise regimes is a priority. They would mirror Russia and China's ability to operate across the Arctic region, strengthening deterrence by demonstrating intra-alliance solidarity and operational skills.

In the long term, the allies can increase interoperability by co-producing critical capacities for future warfare, such as uncrewed systems, icebreakers, and ice-hardened vessels. Similarly, joint or coordinated acquisition of capabilities like C2 systems and uncrewed systems among Arctic allies would help facilitate interoperability across the region.

The US and its allies should ensure that all countries have freedom of navigation in the Arctic and access to all sea routes, including the Northern Sea Route as well as other areas of the ocean where multiple countries have competing claims to the continental shelf. In the short term, South Korea should pursue its plans to establish a container route on the Northern Sea Route since this effort would protect the sea lanes along Russia's coastline against attempts to restrict allied navigation. Using dual-use capabilities is helpful to avoid unnecessary escalation that might trigger offensive military responses. In the long term, Japan may mirror South Korea's decision to open a container route along this route. On the other side of the ocean, Canada should establish a commercial route along Canada's Northwest Passage. The dispute between the United States and the European Union on the one hand and Ottawa on the other over whether the passage is internal or international waters should also be put to rest. Canada could through its actions demonstrate that its operational concern is to ensure responsible governance of its fragile and culturally sensitive waters, as well as coordinate with allies to establish a presence in remote areas.[20] Moreover, the Arctic allies need to acquire icebreakers to protect freedom of navigation in the region, as Russia might challenge this right due to competing claims to some of the waters. In particular, Canada and the Kingdom of Denmark can help manifest freedom of navigation in cooperation with the US.

The remainder of this report examines which capabilities the US and its allies currently have or will have for strengthening Arctic defense and deterrence. It identifies capability gaps these countries will need to fill in the coming decade to ensure robust and credible defense and deterrence. They should manifest monitoring and response options that mirror Russian and Chinese offensive activities, and increase the adversaries' costs of escalatory actions by creating proportionate response options near their Arctic C2 centers and key bases. The assessment encompasses Nordic allies (Iceland, Norway, Finland, Sweden, and Denmark), key strategic allies (the United Kingdom and Canada), and North Pacific allies (Japan and South Korea) because their locations place them on the front line. So their participation in a coalition that strengthens allied monitoring and response options in the Arctic is essential. However, allies such as France, Germany, and Australia are obvious partners in strengthening allied defense and deterrence as the Arctic region is merged with the Baltic Sea and North Pacific regions, and future analyses should consider how they can help close gaps in the allied Arctic defense force posture.

4. ALLIED CONTRIBUTIONS TO A REGIONAL FORCE POSTURE

The US as Coordinator of Operations and Acquisitions

Between 2014 and 2024, the US prioritized protecting freedom of navigation and supported some coordination with Arctic allies such as Canada, Iceland, and Norway, deploying troops and equipment on their territories and conducting joint operations to counter Russia's growing military presence. In addition, NATO increased its exercise and training tempo, enhanced its ISR capabilities, and strengthened intelligence-sharing among allies and partners.[21] However, its members made insufficient investments in aerial and underwater surveillance, defense and naval warfare capabilities (e.g., aerial defense, antisubmarine frigates, and advanced missile technology), heavy icebreakers, polar-capable multimission surface vessels, dual-use sealift capacity, and infrastructure such as undersea sensor networks, C2 systems, ports, runways, and roads.

As a result, the US and its allies have insufficient monitoring, response, and sustainment options. These shortfalls allow adversaries to transit waters and territory undetected, sustain forces in combat theaters for prolonged periods, and successfully challenge allied forces in combat-like situations. In August 2025, Russian submarines challenged the USS *Gerald R. Ford* carrier strike group operating along the Norwegian coastline.

Photo: US marines and Norwegian Home Guard soldiers conduct training during an exercise at an undisclosed remote Arctic island on September 2, 2025. (US Marine Corps)

The exercise showed that P-8 maritime patrol aircraft, which are designed to locate and engage submarines, are not adequate for ASW operations on their own in an area with challenging environmental conditions. In the future, they should be supplemented with underwater capabilities.[22] Rectifying this situation will require expensive investments that are a tall order for the small group of Arctic NATO countries and partners.[23]

Since 2024, the US has prioritized Arctic defense and deterrence in earnest. But most of America's European and Indo-Pacific allies with stakes in Arctic security have competing demands on their defense capabilities, such as the Baltic Sea and Black Sea regions, the Taiwan Strait, and the Korean Peninsula. These demands tend to align with US defense priorities, and as a result, they have neglected Arctic defense, leading to large gaps in the region. The US Department of Defense (DoD) launched its Arctic strategy in 2024, recognizing the need for better monitoring, deterrence against Russia and China, and cooperation with allies to acquire capabilities that strengthen their regional force posture.[24] Because the relatively few allies with stakes in Arctic defense have limited defense budgets, they have difficulty improving their militaries enough, especially when the region's extreme weather conditions and vast distances require specialized equipment and forces. Also, allied forces do not have something like Russia's extensive Northern Sea Route, which is becoming increasingly navigable all year round. So the allies will have to cooperate to divide the labor of Arctic acquisitions and operations to credibly deter Russia and China.

As a relatively weak US adversary, Russia needs to credibly pose a nuclear threat to the US homeland to pursue its own geopolitical and geoeconomic agenda in the North Atlantic and beyond.[25] The Arctic is a critical frontline defense area because it presents the shortest flight path for ballistic missiles targeting the United States. Therefore, Alaska is the center of the US homeland missile defense architecture, including ground-based interceptors, long-range radar, and C2 systems.[26] The US is developing a layered defense system that includes Long Range Discrimination Radar (LDRD) at Clear Space Force Station in central Alaska and the Cobra Dane radar on Shemya in the Aleutian Islands. Additionally, it is developing Next Generation Interceptors (NGIs) to track and counter long-range and high-speed missile threats, including intercontinental ballistic missiles and hypersonic weapons. These will replace or augment existing ground-based interceptors at Fort Greely in Alaska.[27] The US Space Force's budget request for 2026 includes $15.7 billion for the Golden Dome missile defense initiative, emphasizing space-based sensors and interceptors, alongside the modernization of Pituffik Space Base in northwest Greenland and Arctic communications systems.[28]

At present, the United States and its allies have insufficient Arctic satellite communication capabilities, which causes problems for precision-guided munitions and navigational awareness. Space-based ISR radar systems are inadequate to support sea- and air-based ISR capabilities, and part of the airspace over eastern Greenland and the North Pole is not surveilled. Compounding these problems is the fact that the US provides the bulk of NATO's space capabilities, so there is a lack of redundancy.[29] With little Arctic space capacity for military use of its own, Europe cannot work independently from the US on ISR operations or engage targets independently in combat-like scenarios. Moreover, submarine detection and tracking capabilities along the coast of eastern Greenland and in the Barents Sea remain insufficient. Finally, visibility is low in the Arctic, and extensive low-level cloud cover and fog reduce the visual range.

As a result, Russia has a good chance of successfully launching a nuclear attack against the United States or its allies without being detected before impact. For example, a Russian Borei-class SSBN can carry the RSM-56 Bulava intercontinental ballistic missile under Arctic ice cover, such as in the Barents Sea or off the east coast of Greenland. The vessel can then move to a launch position, such as in the Queen Victoria Sea, allowing missiles to follow a polar trajectory, which would minimize flight time to North America and avoid dense radar coverage.

Hudson's Arctic wargame in November 2025 found that, due to insufficient ISR capabilities in the Norwegian Sea and the GIUK Gap, Russia's SSNs and SSGNs also have a good chance of reaching the Atlantic Ocean, from where they can launch nuclear-capable cruise missiles targeting North America if operating close enough to the coastline.

The US operates 14 SSBNs, four SSGNs, and 50 SSNs. The latter can sink ships and submarines, gather intelligence, and launch cruise missiles, and they are essential countermeasures against Russia's submarine force. The US submarine force is the largest and most capable in the world, allowing the US a credible second-strike capability. However, Russian and Chinese seabed-to-space sensor networks are increasingly challenging the US submarine force's ability to operate and hide. A full-scale war requiring penetration of Russia's bastion defense at the Barents Sea cannot rely on US submarines because they may have to operate in non-Arctic theaters. The US will also have to carefully assess the benefits of allowing its submarines to operate in high-risk environments. A safer strategy may be to prepare teams to accompany submarines. Measures such as operating teams that include submarines as well as ships, aircraft, and uncrewed systems can limit the need for crewed submarines. These teams can fire anti-radiation missiles to destroy radars, conduct undersea decoy operations to confuse fire control systems, jam or overwhelm sensors, and conduct mine-hunting and -laying operations.[30]

While its submarine force may not be able to take the lead in responding to threats in the Arctic during a full-scale war, the US is increasing its monitoring and response capabilities by expanding its naval and aerial defense force posture. The US Coast Guard's new Arctic District has funding to expand its icebreaker fleet and close the gap with Russia's fleet. In 2025, the One Big Beautiful Bill Act (OBBBA) provided funding for three new heavy icebreakers, three medium polar icebreakers, and 10 light and medium icebreaking vessels. At present, the US Coast Guard operates two icebreakers nearing the end of their life cycles and a refitted icebreaker built for oil work.[31] The Coast Guard's Arctic District has also proposed upgrading a homeport, commissioned additional cutters, and signed contracts for six Arctic security cutters. The 2026 Coast Guard budget request includes $92 million for new cutters and funding for Arctic infrastructure upgrades.[32] Additionally, the shipbuilding provisions of the OBBBA will likely strengthen the US Navy's Arctic presence. In particular, policymakers should invest in light icebreaking vessels designed to participate in naval warfare alongside submarines.[33] To enhance power projection and deterrence, the US Air Force operates fifth-generation fighter jets like the F-35 Lightning II. The OBBBA will help these aircraft operate in the Arctic by allocating funding to explore and develop existing Arctic infrastructure—such as in Adak, Alaska, in the Aleutian Islands—and to support operations at Eielson Air Force Base and Joint Base Elmendorf–Richardson.[34]

In the Arctic, uncrewed underwater systems will be essential because of the insufficient availability of Arctic crews and the costs and risks of relying on crewed capacities in the event of war. Software failures and human error have troubled the US Navy's drone programs. Nevertheless, the US aims to build an autonomous naval fleet that can move in swarms without human command. Underwater drones will play a critical role in undersea warfare by extending the reach of submarines, improving situational awareness, and increasing combat effectiveness. The OBBBA includes almost $5 billion for maritime autonomous systems, which will change the nature of undersea warfare, provided the Navy adapts its tactics as it better understands the systems' potential and limitations.[35]

Despite years of neglecting its Arctic defense force posture, the US is the main contributor of the multidomain capabilities necessary for deterrence and defense across the Arctic. It provides missile defense of the US homeland and is developing uncrewed systems that will be essential for Arctic monitoring and response operations as well as full-scale warfare. Its submarine force is also the largest and most capable in the world. The re-

mainder of this chapter examines how US allies can contribute to Arctic deterrence and defense to strengthen the US defense force posture.

Nordic Allies

Iceland, Norway, Finland, Sweden, and the Kingdom of Denmark (including Greenland and the Faroe Islands) form part of the northern flank in NATO's Arctic defense force posture. Although Iceland does not have defense forces, Reykjavik's cooperation with the US and NATO on a forward defense force posture gives it a significant role in Arctic deterrence and defense. Norway, Finland, and Sweden are the centerpieces of Nordic defense cooperation because their territory and coastline constitute a front line with Russia. Denmark's responsibility for Greenlandic and Faroese defense allows it a significant role in aerial and undersea surveillance and submarine tracking.

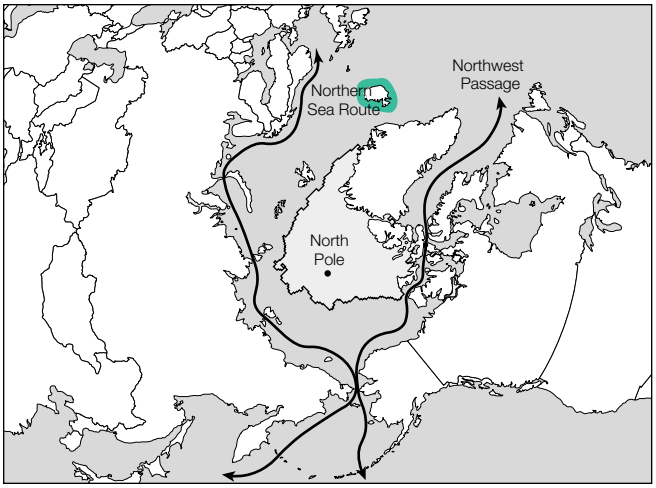
Iceland

Iceland is strategically located in the GIUK Gap, where Russian SSBNs, SSGNs, and SSNs transit to reach the Atlantic Ocean (for the range of Iceland's Arctic interests, see map 6). The country itself has no armed forces, only lightly armed coast guard forces. In 2016 and 2017, the DoD and Iceland's Ministry of Foreign Affairs signed agreements reaffirming Reykjavík's commitment to continue contributing to the common defense of NATO. They included host nation support for air policing and increased rotational deployments, such as ASW forces. The agreements also endorsed the DoD's plans for defending Iceland by military means.[36]

The renewed US interest in Icelandic defense emerged due to increased Russian submarine activity in the GIUK Gap. The agreements boosted Reykjavík's reputation in Washington, which saw Reykjavik as punching above its weight in NATO.[37] Iceland operates air defense and surveillance systems as part of NATO defense, which also involves regular deployment of allied aircraft for air policing, providing an interception capability.[38] The island nation also hosts major NATO exercises, such as Dynamic Mongoose, to prepare allies for ASW and provides host-nation support for the US to control and carry out deployments. This assistance allows Washington to adjust as Russia strengthens its Arctic defense force posture. In December 2025, the Canadian and Icelandic Coast Guards signed a letter of intent in Reykjavik to deepen cooperation on Arctic operations such as search and rescue, icebreaking, environmental response, vessel traffic services, remote sensing, and maritime domain awareness. The agreement strengthens readiness across the European and North American parts of the Arctic.[39]

Gradually, the US has established a significant combat-credible presence in Iceland. The backbone of this is P-8A Poseidon multimission maritime patrol and reconnaissance aircraft. These are designed for ISR and anti-surface and antisubmarine warfare, making them suitable for tracking and engaging Russian submarines and protecting infrastructure, such as undersea cables between North America and Europe. Norway and the UK have since acquired P8A aircraft and also regularly operate with the US out of Keflavik with fighter, patrol, and reconnaissance aircraft.[40]

Map 6. Iceland's Arctic-Relevant Interests



Source: Author.

Since 2021, Keflavik has also been a forward location for US B2 Spirit heavy strategic bombers operating on a rotating basis.[41] This aircraft can deliver conventional and nuclear munitions, and its stealth characteristics allow it to penetrate sophisticated enemy defenses to threaten heavily defended targets, such as Russian SSBNs stationed at the Kola Peninsula near northern Norway. To underpin air and maritime operations, NATO approved the expansion of the Helguvik fuel storage facility near Keflavik, with construction slated to begin in late 2026 and be completed in 2029. This will add 25,000 square meters of maritime fuel capacity and a new berth to support allied activity.[42]

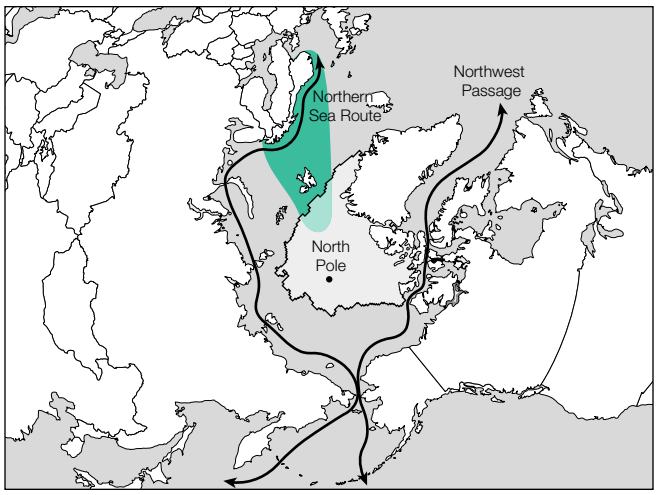
In 2023, Iceland began allowing US submarines to conduct service visits to facilitate allied surveillance and response capacity against Russia's Arctic military presence. This included protecting critical undersea infrastructure. Iceland does not officially allow port calls from nuclear-armed US submarines, but in practice it relies on a *don't ask, don't tell* premise since Iceland does not inspect submarines but relies on US assurances that visiting submarines do not carry nuclear weapons.[43] On July 9, 2025, the *Los Angeles*–class fast-attack submarine USS *Newport News* (SSN-750) conducted the first-ever port visit by a US nuclear-powered submarine in Iceland, marking deeper undersea cooperation and visible deterrence in the High North.[44] In 2025, Iceland also embraced NATO's decision to increase expenditure on defense-related capabilities, such as critical infrastructure and civil preparedness, to 1.5 percent of GDP by 2035.[45] The commitment includes additional spending on the facilities at Keflavik Air Base, Icelandic ports, and host country support.[46] In 2025, Prime Minister Kristrún Frostadóttir stated that Iceland needs to have "skin in the game" on Arctic defense despite lacking a standing army, foreshadowing adjustments to posture and spending.[47] Before she made that remark, Iceland hosted an Arctic Security Policy Roundtable in May, which encompassed senior defense officials from the US, Canada, and Nordic nations, including Greenland and the Faroe Islands. The meeting emphasized Iceland's convening role in Arctic security.[48]

Despite its lack of defense capabilities, Iceland is a long-standing integrated part of the US North Atlantic defense presence. In this role, its main tasks are to help allies track and, if necessary, engage Russian nuclear-capable submarines that threaten NATO allies and partners. As Russia's militarization of the Arctic has increased, Iceland has readily approved NATO and US requests for deployment of additional capabilities. Reykjavik's forthcoming attitude toward US requests for a stronger defense force posture at an early stage of the new strategic competition makes the country an integral part of the US forward force posture operating in the GIUK Gap and the Norwegian Sea. As a result, Iceland plays a key role in deterrence and defense in the North Atlantic part of the Arctic region.

Norway

Norway is the only genuine Arctic Nordic country (for the range of its interests in the region, see map 7). It is strategically located, bordering Russia by the Barents Sea on the Kola Peninsula. Russian submarine bases are 40–110 kilometers (roughly 25–70 miles) from the Norwegian border. Submarines from these bases headed toward the Atlantic Ocean must first transit

Map 7. Norway's Arctic-Relevant Interests



Source: Author.

through the Bear Gap between the Norwegian Svalbard Archipelago and northern Norway. In a military conflict with NATO member states, Russia would seek to control the Bear Gap to protect its strategic missile submarines and access to the Atlantic Ocean.[49] The Svalbard Treaty prohibits the establishment of military bases or fortifications on the archipelago, but Norway patrols regularly in waters and airspace near it for deterrence purposes. The country's Svalbard satellite ground station is central to allied Arctic surveillance as the only Arctic facility that can see and service low-altitude polar orbiting satellites on every revolution as the Earth rotates. This provides almost continuous satellite flyovers, which facilitates weather data reception, ISR operations, and navigation support.[50]

The US and Norway renewed their 1950 mutual defense assistance agreement in 2021 with a supplementary defense cooperation agreement.[51] The deal allowed the US to build facilities at air stations and airfields in Rygge, Sola, and Evenes, and it granted the US access to Ramsund Naval Station.[52] Together, these facilities allow the US to track and engage Russian submarines as they exit the Barents Sea and travel down the Norwegian coastline, using, for example, P-8A Poseidon maritime surveillance aircraft. In 2024, the two countries signed another updated supplementary defense cooperation agreement allowing greatly expanded storage of US military equipment, munitions, and other war materiel and unimpeded US access to 12 military areas, including Andøya and Bardufoss.

With the admission of Finland and Sweden to NATO, the Norwegian port of Narvik became a principal Nordic reinforcement hub that the US regularly uses to debark equipment and personnel. Norway has also become the principal organizer of major Arctic exercises, such as the biannual Nordic Response, during which NATO countries train while enhancing interoperability and crisis response in extremely cold climates. In October 2025, NATO inaugurated a combined air operations center in Bodø in northern Norway, adding air C2 redundancy and thereby emphasizing the growing importance of the Arctic for the transatlantic alliance.[53] Reiterating Arctic importance, in December 2025 Joint Force Command Norfolk (in Virginia) rather than Joint Force Command Brunssum (in the Netherlands) became the Nordic NATO headquarters, moving the US into a leading coordinator role and tightening transatlantic reinforcement planning.[54]

US-Norway cooperation agreements allow the two countries to use Andøya Air Station in northern Norway as a joint operational base. From here the two militaries can launch long-range precision weapons and conduct air defense against cruise missiles by means of a satellite station with a warning sensor tracking incoming cruise missiles. Andøya Space Center is also a launch site for Arctic broadband satellites with payloads for US and Norwegian defense. Because of Russia's nuclear threat, Norwegian space capabilities play a crucial, if not sufficient, role in supporting the US Space Force.[55] In April 2024, Norway and the US announced a first-of-its-kind cruise missile early warning satellite ground station at Andøya to strengthen indications and warning as well as allied missile defense integration. Then in August 2024, the US Space Force, Space Norway, and Northrop Grumman launched a two-satellite constellation designed to ensure comprehensive coverage of the High North. As a result of this mission, a secure US military satellite communications payload and a Norwegian military broadband payload have for the first time been integrated onto a commercial satellite constellation with an international partner.[56] In addition, Andøya is becoming an Arctic base for large drones with adapted sensors and systems for continuous situational awareness and surveillance of submarine activities in high-tension maritime areas. The Norwegian Defence Materiel Agency is conducting a concept selection study to understand how high-altitude long-endurance (HALE) and medium-altitude long-endurance (MALE) maritime uncrewed aerial vehicles (UAVs), such as the MQ-4C Triton and the MQ-9B SeaGuardian, can complement Norwegian, UK, and US P-8A Poseidon coverage in the Barents and Norwegian Seas.[57] With the development of aerial drones as part of an ASW fleet that also encompasses surface vessels and underwater drones, the Andøya drone base will be central

to penetrating the Russian bastion strategy protecting submarine bases at the Kola Peninsula.

Norway's defense industrial base has also become important in the Arctic context. Besides its space industry, the country's production of missiles, dual-use ships, and helicopter-carrying ice-class coast guard vessels, as well as its F-35 engine maintenance,[58] are among its niche specializations that are crucial in an Arctic context. In 2023 and 2024, three 9,800-ton *Jan Mayen*–class ice-hardened offshore patrol vessels were all delivered and commissioned, providing long-endurance helicopter-capable hulls for Svalbard and High North presence.[59] Norway is also rebuilding maritime helicopter capacity with the MH-60R Seahawk, conducting the first deck landing in October 2025 ahead of Norway's deliveries.

According to its 2024 fleet plan, Norway plans on building six ThyssenKrupp Marine Systems (TKMS) Type 212CD–class submarines, with deliveries beginning in 2029.[60] Oslo has also committed to building at least five Type 26 ASW frigates fitted with helicopters, whose delivery should begin in 2030.[61] The frigates are intended to operate as an interchangeable joint fleet with the UK Royal Navy.[62] These and other naval investments are aligned with broader NATO C2 changes, such as the combined air operations center in Bodø and the expanded access for US and other allied forces. The contributions further enhance the coordinated improvements to maritime domain awareness, air policing, and reinforcement routes across the Norwegian and Barents Seas.

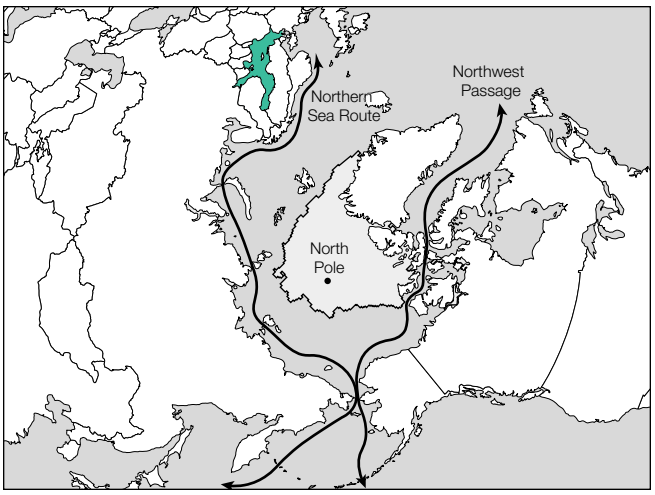
Norway has demonstrated due diligence in using its strategic Arctic location to build key capacities in multiple domains that help protect allied territory and maritime space against Russia's nuclear threat. It has been a frontrunner in building a Nordic logistics hub, allied aerial C2, an Arctic space node, and ASW surface and subsurface assets that are closely integrated with US and NATO forward postures in the GIUK and Bear Gaps. These investments help prepare allies for future warfare. The Norwegian fleet plan was ready to launch as the Arctic became a major focus of US defense and security planning in 2024. Overall, Norway's track record of offering timely and indispensable Arctic deterrence and defense contributions integrated with the allied forward forces makes it a key country in building a combat-credible Arctic force posture.

Finland

Finland is a Baltic rather than an Arctic country, making it less important to US homeland security than Iceland and Norway, but it is still important to the security of NATO's northern flank (for the range of Helsinki's interests in the region, see map 8). For this reason, Finland has been fully operationally integrated into NATO for the past decade. When Helsinki joined the alliance in 2023, the move mainly served to include it in the Article 5 mutual defense commitment and allowed it to promote defense initiatives, through which it transitioned from national to regional NATO defense plans.[63]

Finland's 1,340-kilometer (830-mile) land border with Russia is the longest border between a European Union member state

Map 8. Finland's Arctic-Relevant Interests



Source: Author.

and Russia, positioning Finland as a frontline state on NATO's northern flank. The country's strategic importance is in defending its airspace and territory to deter a Russian invasion of continental Scandinavia and defeat Russian aerial, cyber, and land capabilities positioned to fight allied forces in the Arctic at sea. Finland's proximity to Russia, its loss of 10 percent of its territory to Russia in the 1939–40 Winter War, and Helsinki's post–World War II policy of neutrality and good neighborly relations with Russia have encouraged Finland to continuously maintain credible civilian and military deterrence and defense forces against Russia. For example, Finland has long maintained a large field-artillery capability. In 2022, Helsinki ordered 64 F-35 fighter jets to modernize its air defense and combat readiness.[64] Altogether, these features make Finland central to the allied defense force posture in the Arctic, in particular with regard to the surveillance and deterrence of Russia and the reinforcement of Norway and Sweden.

In 2023 after Finland joined NATO, Washington and Helsinki signed a defense force agreement that gave the US access to 15 military bases and exercise areas in the country. The US is allowed to bring defense equipment, supplies, materials, and soldiers to Finland as well as set up military zones to which only the US has access. The areas include four air bases, a military port, and improved railway infrastructure to Kemijärvi near Russia in northern Finland to facilitate the transit of allied equipment and reinforcements. The US will also have access to the Ivalo Border Guard Base near the Kola Peninsula, large training areas in Rovajärvi and elsewhere, and storage facilities in Misi.[65]

As a state on the front line against Russia, Finland has advocated for closer defense cooperation with Norway and Sweden. Finland is much farther from the Russian submarine bases at the Kola Peninsula than Norway and offers land rather than sea access. For this reason, it is a secondary player in direct allied sea denial in the Barents region. Nevertheless, the interdependence of northern Scandinavia will require Finland to be interoperable with its Nordic neighbors from day one of any military operation. Therefore, NATO logistics exercises in 2024 rehearsed moving a US brigade's vehicles and containers through the port of Narvik via Sweden into Finland. Norway has also upgraded the Ofot railway line running from Narvik, explicitly prioritizing allied military mobility to Finland. Moreover, Finland, Norway, Sweden, and Denmark signed a framework agreement on high-frequency radios that operate independently of satellites and the Global Positioning System (GPS). As part of this agreement, Finland and Sweden made an $18 million order of manpack cognitive networked high-frequency radios to harden resilient, beyond-line-of-sight communications.[66]

Due to its long land border with Russia, Finland is key to the defense of northern Europe as a whole. In 2024, NATO decided to establish the Multi-Corps Land Component Command – North (MCLCC-N), which is co-located with the Finnish Army Command in Mikkeli. In a crisis, MCLCC-N will lead land operations in the High North, under Joint Force Command Norfolk.[67] The alliance will also create a Forward Land Forces (FLF) presence in Rovaniemi and Sodankylä, with Sweden as the framework nation, which will reinforce deterrence along Finland's northern corridor.[68] This command architecture embeds Finland as a land-operational anchor in NATO's northern regional plans.

Finland has defense industrial capabilities that give it a central role in Arctic capacity building. Its location by the Gulf of Finland and the Gulf of Bothnia and its history of winter navigation support a globally competitive icebreaker ecosystem of shipyards and suppliers, producing complex ships in small runs. During and after the Cold War, Finland was one of Moscow's top suppliers of icebreakers. Russian investors acquired its largest producer, Helsinki Shipyard, in 2013, but the 2022 invasion of Ukraine forced them to sell. Canadian Davie Shipbuilding, owned by British investors, bought Helsinki Shipyard in 2023, combining Canadian and Finnish Arctic shipbuilding expertise.[69]

Since 2013, Finland's state-run enterprise Arctia, which operates Finland's icebreaker fleet, has worked on cooperating with

the US on the use of icebreakers. Initially, Helsinki offered to share seven mid-heavy icebreakers that Finland used in winter with the US in summer, when Arctic operations occur in US and Canadian waters. The deal did not go through, but in 2015, the US began discussing the need to update its icebreaker capacity.

The US possesses only one heavy and one medium icebreaker and has commissioned a third, which the US Coast Guard will continue to operate until it acquires additional vessels. In 2019, the DoD awarded US-based VT Halter a contract for a polar security cutter with an option to build two more, but cost and production time overruns have encouraged the US to look for other options.[70] At the July 2024 NATO summit in Washington, the US, Canada, and Finland launched the Icebreaker Collaboration Effort Pact (ICE Pact), which commits the parties to joint development and production of icebreakers.[71] The second Trump administration has continued emphasizing the ICE Pact and US-Finland cooperation with ambitions to produce a new fleet of icebreakers to match Russia's fleet of 43 polar vessels. Ottawa has also committed to modernizing and expanding its icebreaker fleet and has ordered two heavy polar icebreakers for the Canadian Coast Guard. Finnish producers will perform parts of both construction projects.[72]

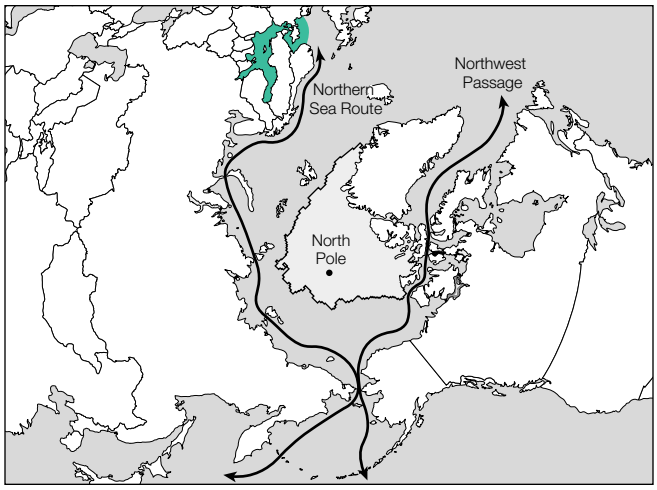
The Canadian shipbuilder Davie is buying Texas Gulf Coast Shipyard to facilitate US construction of icebreakers. However, Finland possesses unique know-how that is not easily transferable, and hence icebreakers form part of the framework for commercial contracts between the US Coast Guard and Finnish shipbuilders that President Trump signed in October 2025. In December 2025, the US Coast Guard awarded contracts for up to six medium Arctic security cutters. Finland's Rauma Marine Constructions will build up to two of these and deliver the first in 2028. Using Finish designs, Bollinger Shipyards will build up to four more in Louisiana and deliver the first in 2029.[73] The ICE Pact supported these awards, which position Finnish industry to supply designs, modeling, and production capacity and give Finland a durable role in allied polar shipbuilding.

Although it is a Baltic rather than Arctic country with only secondary importance to US homeland defense compared to Norway and Iceland, for more than a decade Finland has sought to engage the US in its industrial icebreaker capability, eyeing Washington's need to modernize its small, aging fleet. In parallel, Finland's geostrategic position as a continental frontline state against Russia and its air and land modernization allow it to play a significant supportive role in US and allied Arctic defense and reinforcement plans.

Sweden

Like Finland, Sweden is a Baltic rather than an Arctic country, and it does not have a land border with Russia (for the range of Stockholm's interests, see map 9). However, it has a strategic maritime location on the Baltic Sea opposite Russia's Leningrad Military District. This district encompasses much of Russia's Arctic region and the Russian enclave Kaliningrad, where NATO believes Russia hosts nuclear-capable systems and possibly stores warheads. The allies therefore need ISR and sea control in this area. Sweden's land borders with Norway and Finland make it strategically important for deterring Russian land-based

Map 9. Sweden's Arctic-Relevant Interests



Source: Author.

attacks across northern Scandinavia. With the US expecting Europeans to shoulder more of the burden for their defense, frontline allies will increasingly need the ability to deter and defend their home regions until allied reinforcements arrive. Due to its geography and capabilities, Sweden can assist with these efforts and play a principal role in NATO's forward defense of the Baltic Sea region. The country joined the alliance on March 7, 2024, formalizing its operational integration and allowing all the Nordics to integrate under one operational headquarters, Joint Force Command Norfolk.

In December 2023, the US and Sweden signed a defense cooperation agreement giving the US access to 17 military bases and training grounds in Sweden.[74] The terms are much like those with the other Nordic countries, including US rights to deploy units, store military equipment, and carry out defense exercises in Sweden under US law. The two countries designed the agreement to deter Russian aggression in the Baltic Sea region rather than to protect Swedish territory. This concept is apparent in how Sweden serves as a transit route for supplies from Finland and Sweden to the Baltic Sea region, bypassing vulnerable land routes near the Polish-Lithuanian border.[75] The agreement caused heated debate in the Swedish parliament because it lacks clauses prohibiting nuclear weapons on Swedish territory. Indeed, Swedish Prime Minister Ulf Hjalmar Kristersson declared that in wartime, the country could decide to host nuclear weapons. However, an overwhelming majority still voted to pass the agreement.[76]

Sweden has intensified its cooperation with Norway and Finland in areas such as military mobility and communication. The three countries also frequently participate in US Bomber Task Force deployments. For example, they conduct B-52 live weapons drops and local fighter jet flyovers of strategic infrastructure, such as parliamentary buildings. Sweden also hosted the military exercise Baltic Operations 2024 on Gotland, integrating US Marines and allied forces ashore in scenarios to protect Baltic sea lines of communication (SLOCs) near Kaliningrad.[77] Analysts have described Gotland as an unsinkable aircraft carrier that can project long-range coastal missile fires across much of the Baltic region.[78] These operations highlight NATO's ability to rapidly project combat power.[79] Sweden also contributes to the reception, integration, and deployment of allied brigades in northern Scandinavia by leading the planning and building of the aforementioned FLF NATO presence in Finland. Through this formation, European member states will help reinforce NATO's northern flank.[80]

Sweden's previous neutrality demanded self-reliance so that it could defend its non-aligned position and deter Russia, and it has shaped the country's role as a leader of forward defense in the Baltic Sea. So despite having a population of approximately 10 million, the country now has a defense industrial base that punches far above its weight. Sweden designs, builds, and operates a fleet of submarines, such as the A26 *Blekinge*-class submarine.[81] It also produces surface combatants, Gripen fighters, Combat Vehicle 90s, early airborne warning radars, artillery systems, small arms and munitions, autonomous systems, and space assets. In 2023, Sweden's Spaceport Esrange in Kiruna became the mainland EU's first orbital launch site, and it will likely conduct orbital launches soon, making it valuable to NATO and US Space Command.[82]

Sweden's submarines are particularly important for NATO's defense force posture in the Baltic Sea. They are small and silent, and they can stay underwater for a long time. This allows them to defeat an aircraft carrier and operate undetected in the Baltic Sea, as demonstrated in an ASW exercise in 2025. Together with the country's surface and air forces and coastal missile units, these submarines pose a credible maritime deterrent in the shallow inlet- and island-rich Baltic Sea.

Stockholm and Helsinki have the closest defense relationship of the Nordic countries, and as part of this cooperation, they are spearheading joint Nordic acquisitions of capacities such as army vehicles and firearms. Formal steps to this end were taken

in June 2025.[83] Sweden's Gotland and east coast capabilities, Finland's sea denial (including its naval mines), and the allies' land posture in northern Scandinavia form a layered regional defense. Furthermore, during a war Sweden could combine its coastal warfare focus with Finland's sea denial focus to effectively trap Russian naval forces in the Baltic.[84]

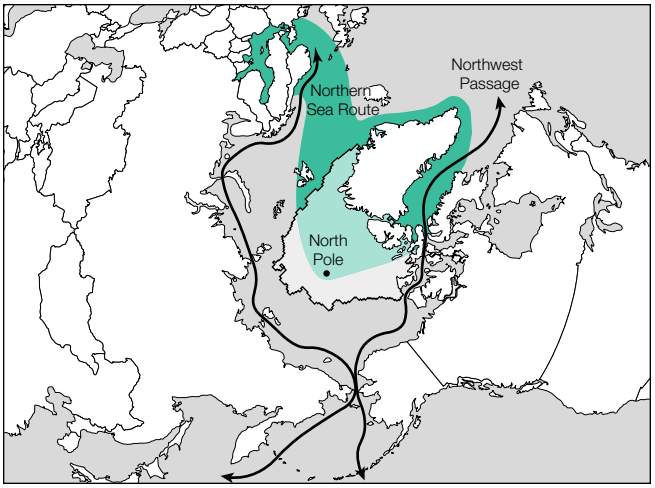
Like Finland, Sweden belongs to the Baltic Sea region rather than the Arctic. Its main defense asset is its history of self-reliance, which has encouraged it to foster a thriving defense industry and develop a credible deterrent against Russia. In particular, its maritime surveillance and undersea warfare capabilities are key to maintaining control of the Baltic Sea in the event of Russian aggression, especially in combination with the surface capabilities of its closest defense partner, Finland. While the region is not an immediate concern for US homeland security, Washington would not want Russia to acquire Swedish defense assets or control Baltic SLOCs. Sweden's industry, ISR, undersea warfare, and rapid reinforcement routes will help keep Russia at bay in the initial phases of a Baltic contingency, while enabling rapid allied follow-on combat power.

Denmark

The Kingdom of Denmark is split between the Baltic and Arctic regions (for the range of the kingdom's interests, see map 10). Denmark is a Baltic country, while the autonomous territory of Greenland (roughly 2.16 million square kilometers, or 836,000 square miles) is Arctic, and the Faroe Islands (roughly 1,400 square kilometers, or 540 square miles) are Arctic in a strategic sense due to their location in the GIUK Gap. Denmark is constitutionally responsible for the kingdom's defense. This is a vast area to defend for a country of approximately 6 million citizens.

Denmark and the US signed a defense cooperation agreement in 2023 that is very similar to those Washington signed with other Nordic countries.[85] The agreement allows the US to access three Danish air bases in western Denmark—Karup, Skrydstrup, and Aalborg—and to station personnel, store military material and equipment, and undertake maintenance, training, and exercise activities on Danish territory. The agreement caused heated political debate due to concerns about the consequences of US personnel operating in Denmark under US legal authority.[86] Nevertheless, the agreement was ratified in 2025.[87]

Map 10. Kingdom of Denmark's Arctic-Relevant Interests



Source: Author.

The US military presence in Denmark is predominantly relevant in a Baltic Sea war scenario in which the US will likely play a supportive rather than a leading role. In an Arctic war scenario, the kingdom's autonomous territories assume greater strategic significance. At the eastern entrance to the GIUK Gap, the Faroe Islands are critical for surveillance. NATO will use a new radar station on the mountain Sornfelli to help close the surveillance gap in the airspace between the Faroe Islands, Norway, Iceland, and the UK.[88] The radar will be operational in 2030 or later.[89]

The 1951 Defense of Greenland agreement, which was updated in 1981 and 2004, recognizes that Denmark may need US assistance to defend Greenland and allows the US to operate military bases in the country. The US established Pituffik Space

Base (formerly Thule Air Base before the US Space Force took control of it in 2020) on the northwestern coast of Greenland, which supports missile warning and defense and enables US space superiority.[90] Pituffik hosts the Twelfth Space Warning Squadron, which operates Pituffik's solid-state phased-array radar to detect and track sea-launched and intercontinental ballistic missiles launched over the polar approaches. The site contains the world's northernmost deep-water seaport from which US Navy surface vessels and submarines conduct Arctic patrols and training exercises.

Recognizing persistent gaps in polar coverage and resilient communications across the High North, the US has been reviewing better sensors and new space-based missile warning and observation systems with greater Arctic and polar coverage, alongside ongoing modernization of Pituffik. These efforts seek to reduce the remaining surveillance seams over parts of eastern Greenland and high-latitude airspace. At present, Pituffik provides insufficient missile warning and defense in part of the airspace over eastern Greenland and the North Pole because of the thickness of the ice sheet in the central and northern interior of Greenland.[91] This situation allows Russia good opportunities to launch a successful missile attack against the US homeland. To improve its capabilities and in cooperation with the Swedish Ministry of Defence, Danish Defence has invested in a satellite enabling space-based maritime surveillance in the waters around Greenland. It can use the satellite, which was ready for technical demonstration in September 2025, for target detection and reporting, improving situational awareness and tactical observations around the coast of eastern Greenland.[92] To strengthen situational awareness around Greenland's waters, Danish Defence has cooperated with the Swedish Defence Materiel Administration on constructing the Bifrost satellite. Launched in 2025, the microsatellite will enable space-based maritime surveillance and artificial intelligence–supported target detection and reporting in the North Atlantic and Arctic. In particular, it will contribute real-time observations and tactical reporting around Greenland's coast.[93]

To establish presence and conduct surveillance at sea, Denmark operates four *Thetis*-class light ice-capable patrol vessels nearing the end of their life cycle. The vessels have ice-reinforced hulls that can work through first-year ice up to one meter thick. Each vessel carries a cannon and a heavy machine gun, and embarked MH-60R Seahawk helicopters provide a dipping sonar capability. However, sonar performance and ASW prosecution in ice-filled, acoustically complex waters remain challenging for this platform.

In 2021, Denmark announced an Arctic capacity package of 1.5 billion Danish kroner (roughly $240 million at the time) for enhanced surveillance, including long-endurance drones, coastal radar, and satellite-based capabilities.[94] Progress has been uneven, so since 2024, the Danish military, in coordination with Greenland and the Faroe Islands, has accelerated air and maritime surveillance measures, such as more funding for long-endurance drones and for the Sornfelli radar.

As the security environment deteriorated and the United States began expecting more from allies, Denmark launched a new Arctic and North Atlantic effort in December 2024, and in January 2025, concluded an agreement that allocated approximately 14.6 billion Danish kroner (roughly $2 billion at the time) for this initiative. (In Denmark, an *agreement* is a political deal between the government and opposition parties.) The package covers three Arctic patrol ships that can carry helicopters and uncrewed systems. It will also fund two long-range drones, expanded satellite capacity, and ground-based sensors to improve situational awareness.[95]

In October 2025, Denmark, in close collaboration with Greenland and the Faroe Islands, announced a second agreement totaling 27.4 billion Danish kroner (roughly $4.3 billion at the time). This included two more Arctic vessels, a maritime patrol aircraft capability, additional drones, a new joint Arctic command headquarters, and steps toward access to an icebreaker capability and a North Atlantic undersea cable. Later, in De-

cember 2025, the US approved a potential foreign military sale of up to three Boeing P-8A Poseidon maritime patrol aircraft to Denmark, which shows that the kingdom intends to contribute credibly to allied ISR and ASW operations in the GIUK Gap and the Norwegian Sea.[96]

Meanwhile, Denmark has reinforced its summer presence by operating frigates around southern Greenland and the GIUK Gap.[97] However, the navy's large air-defense frigates are not ice-rated for persistent operations along Greenland's east coast. Danish planners therefore emphasize Arctic-adapted patrol vessels and air ISR to cover contested waters while progress on ice-capable capacity and maritime patrol aircraft proceeds.[98]

Because the autonomous territories had a limited role in defense planning until 2025, Denmark has not integrated its Baltic and Arctic defense force postures to achieve credible deterrence of Russia. With the 2025 agreement, Denmark is moving toward phased integration: closing gaps in airspace surveillance over the Faroe Islands and Greenland; expanding surface and subsurface surveillance along eastern and southern Greenland, where Russian submarines transit to the Atlantic Ocean; and strengthening the capacity to help deny Russia access to the North Atlantic approaches.

In addition to preventing Russia from accessing the Atlantic via the GIUK Gap, Denmark plays an important role as a second line of defense should Sweden and Finland fail to deny Russia access to the Baltic Sea. To support this mission, Denmark operates patrol ships and helicopters for surveillance of critical infrastructure and surrounding waters. The Royal Danish Navy retains air-defense frigates and ASW-capable platforms, and the Royal Danish Air Force fields the F-35A Lightning II. Denmark is also pursuing layered air defense and long-range precision effects, including US-approved Advanced Medium-Range Air-to-Air Missiles–Extended Range for ground-based air defense.[99] This will strengthen the denial options in Øresund and adjacent approaches in close cooperation with Sweden. (Øresund, known as Öresund in Swedish, is a strait connecting the Baltic and North Seas that forms the border of Denmark and Sweden and is a transit route to the North Sea.)

Denmark's planned acquisitions focus on surveillance and platforms that, together with allied forces, can defend against and deter Russian activity. Investments in Arctic patrol vessels with embarked drones, long-range uncrewed systems, satellite and ground sensors, and maritime patrol aircraft support an integrated Baltic–Arctic posture across the Kingdom of Denmark, close key ISR gaps, and bolster allied control of the GIUK Gap and approaches to the North Sea.

Key Strategic Allies

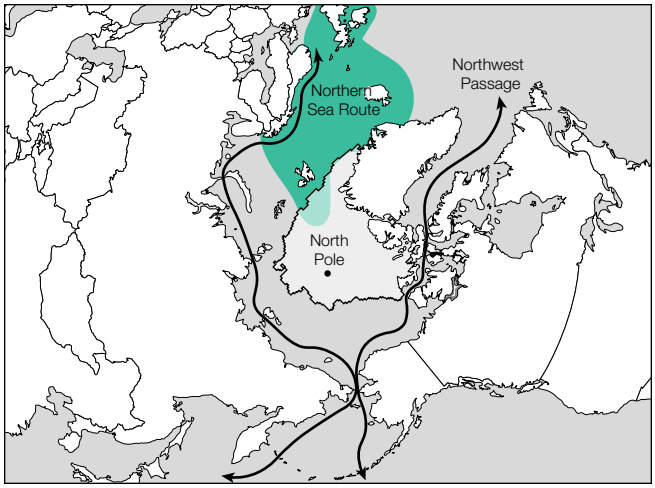
The United Kingdom and Canada have long-standing strategic defense partnerships with the United States due to their geostrategic locations. Together with Australia and New Zealand, both are members of the highly integrated Five Eyes intelligence-sharing alliance. The UK's location at the eastern entrance to the Atlantic and Canada's location in the far north of the North American continent make them essential to US homeland security in the Arctic. The UK borders the GIUK Gap as well as the English Channel, and Canada has a vast coastline along the Arctic Ocean, which makes them both central to deterrence of and defense against Russian nuclear threats.

The United Kingdom

The UK is not an Arctic country. However, it is strategically located at the GIUK Gap, where Russian submarines transit to the Atlantic Ocean. An alternative route for Russian submarines is through the North Sea and the English Channel between the UK and France. So the UK's location gives it a key role in detecting, tracking, and hunting Russian submarines and aircraft. (For the range of Britain's Arctic interests, see map 11.)

Since 2021, London has been adjusting its Arctic security and defense policy because strategic competition now shapes the environment and because Russia's military buildup constitutes

Map 11. The United Kingdom's Arctic-Relevant Interests



Source: Author.

one of the region's main threats.[100] As part of the 2025 Strategic Defence Review, the UK reaffirmed its commitment to maintaining a "coherent defence posture in the Arctic," emphasizing deployments of the littoral strike group, carrier strike assets, joint aviation, and maritime patrols, while noting that permanent basing decisions will follow later in the review's implementation.[101]

Due to its special relationship with the US since World War II, the UK can draw on deep intelligence, defense, and security working relationships. The 1958 US–UK Mutual Defense Agreement has formed the basis of defense cooperation between the two countries, including on nuclear weapons. Britain purchases American nuclear weapons technology while building its own submarines and warheads. This has made London reliant on US technology while keeping it close to US advancements.[102] In 2024, a significant amendment removed a sunset clause, ensuring the indefinite continuation of defense cooperation.[103]

The UK does not have Arctic-specific capabilities (except for one medium icebreaker operating in the Antarctic) since it is located in the ice-free part of the North Atlantic. Nevertheless, it fields critical capabilities for Arctic deterrence. These include ASW frigates, submarines, P-8A maritime patrol aircraft, an ice patrol ship primarily for Antarctic use, a multi-role ocean surveillance vessel, and fighter jets. His Majesty's Naval Base Clyde, home to the Royal Navy's submarine fleet, and Royal Air Force (RAF) Lossiemouth, home to the Quick Reaction Alert Typhoon aircraft and the P-8As, are both in Scotland, which is ideal for GIUK Gap and English Channel operations. In the event of war, the UK has committed to respond jointly with armed forces from across the US.[104] In late November 2025, the RAF deployed three 120 Squadron P-8A Poseidon aircraft to Keflavik. It is the UK's largest overseas maritime security patrol deployment to date, and it signals the country's enhanced commitment to NATO surveillance in the High North.[105]

The UK is leading the Joint Expeditionary Force, which it founded together with Norway, Denmark, Estonia, Latvia, Lithuania, and the Netherlands in 2014. Finland and Sweden joined in 2017, and Iceland in 2021. These allies designed it to provide agile deterrence in northern Europe, including the Arctic.[106] The UK is also co-chairing the Northern Group of the three Baltic states, the five Nordic states, Poland, the Netherlands, and Germany, which these countries established in 2012 as a consultative forum. These platforms position the UK as the principal coordinator of the Nordic Arctic defense posture.

Recognizing that it needs to reorient its defense force so that it can prioritize the Arctic more while still leading coordination efforts, the UK is reviewing the asset mix needed to operate effectively in the Arctic. Beyond regular deployments, HMS *Protector* and carrier strike groups routinely patrol northern waters.[107] In February 2025, the UK initiated negotiations with Norway on a comprehensive defense partnership, the Lunna House Agreement. This will enhance cooperation on protecting critical undersea infrastructure and deploying Type 26 frigates.[108] Presumably, the partnership will center on tracking the movements of Russian submarines through the Norwegian Sea and along the UK coastline as they move toward the Atlantic Ocean.

The UK is innovating in maritime surveillance. Under Project CABOT – Atlantic Net, which was initiated in 2025, the Royal Navy plans to field an uncrewed ASW fleet, including surface vessels and subsurface systems, to monitor the GIUK Gap, reduce dependency on aging frigates, and integrate with P-8As and Type 26 frigates.[109]

Britain's polar capabilities remain limited, but the UK may expand these. In July 2025, Defence Minister Luke Pollard confirmed that the UK is considering including an Arctic-class icebreaker in its Arctic strategy and will evaluate this in the Defence Investment Plan.[110]

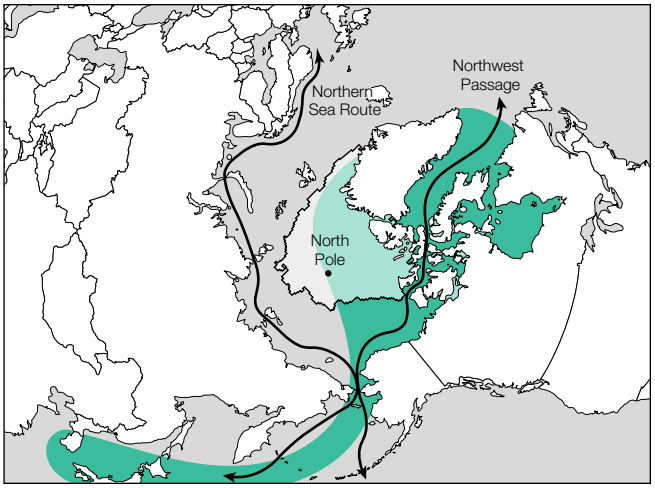
The UK's location, NATO partnerships, and wide-ranging military capabilities make it a cornerstone of allied Arctic defense. The country offers nuclear deterrence, P-8As, aircraft carriers, submarines, frigates, amphibious forces, and uncrewed assets that position it as a key ally in the GIUK Gap. As the Arctic receives greater strategic priority, UK investments in uncrewed systems, Arctic-ready ships, and bilateral arrangements with Norway aim to enhance all-domain deterrence and ensure resilience against Russian submarines and infrastructure threats on the route from the Barents Sea to the GIUK Gap.

Canada

Canada and the US have cooperated closely on defense since the 1940 Ogdensburg Agreement, which established the Permanent Joint Board on Defense to coordinate joint North American defense.[111] This collaboration led to the establishment of the bi-national North American Aerospace Defense Command (NORAD) in 1958, which became permanent in 2006. NORAD's core missions are (a) aerospace warning and control and (b) maritime warning. In 2012, the Tri-Command Framework for Arctic Cooperation was signed to expand bilateral military training and exercises to enhance joint and combined readiness and lower the chance of conflict.[112]

Canada's proximity to the US makes it the closest US defense partner in the Arctic (for the range of Ottawa's Arctic interests,

Map 12. Canada's Arctic-Relevant Interests



Source: Author.

see map 12). The Northwest Passage, stretching roughly 800 kilometers (500 miles) north of Baffin Island to the Beaufort Sea, connects the Atlantic and Pacific Oceans and is crucial for fast submarine transit between theaters. With Russia and China increasing their dual-use and military presence, maintaining presence and surveillance in this vast region is a top priority. NORAD has also intercepted Russian and Chinese strategic bombers and tracked Chinese research vessels operating near Alaska.[113] Meanwhile, Canada participated in US Indo-Pacific Command's joint force exercise Northern Edge 2025, testing integrated operations across domains. The exercise featured a US Navy carrier strike group operating from the Gulf of Alaska through the Aleutian Islands—in the air, on land, and at sea.[114]

NORAD uses a network of satellites, ground-based and airborne radars, and fighter aircraft to detect and track aircraft and work out appropriate responses in defense of North America. In 2022, Canada decided to modernize NORAD in cooperation with the US. The 20-year upgrade encompasses a new surveillance system capable of tracking modern weapons and delivery systems, such as long-range cruise and hypersonic

missiles. It also features an early warning radar covering the northernmost approaches of North America, another layer of detection through a sensor network, and strengthened space-based surveillance capabilities.[115] Canada operates fighter aircraft and ISR aircraft for detection, deterrence, and defense in the Arctic. It is planning to acquire a total of 88 F-35 fighter aircraft, although the deal is still up for grabs.[116] In 2025, Canada signed a contract for 11 MQ-9B SkyGuardian drones and six ground control stations, and the first deliveries are anticipated by 2028.[117] In 2024, Canada finalized a foreign military sale for up to 16 P-8A aircraft, with first deliveries expected in 2026. These assets strengthen the country's maritime surveillance and response capabilities.[118]

To increase its year-round presence and responsiveness across the Arctic, Canada is establishing a network of northern operational support hubs consisting of airstrips, logistics facilities, and equipment. It plans to establish the hubs in Iqaluit, Inuvik, Yellowknife, and other locations yet to be identified to extend the armed forces' operational reach, minimize logistics constraints, and enhance support for military operations in the Arctic.[119]

Canada operates the world's second-largest icebreaker fleet after Russia, encompassing 20 vessels of varying sizes operated by the Canadian Coast Guard. Canada is currently reviewing the fleet to decide how many new polar icebreakers it should procure and which existing vessels it should maintain. The country is building two new heavy icebreakers, which will allow for longer operations at higher altitudes starting in 2030 and strengthen Canada's presence in remote Arctic areas. Seaspan in Vancouver will build one, while Chantier Davie will build the other, partly in Finland and partly in Canada, as part of the 2024 ICE Pact between Canada, the United States, and Finland.[120]

The Royal Canadian Navy operates six modern ice-capable Arctic patrol and offshore vessels that support surveillance and ASW in partnership with the US and other Arctic allies.[121] In September 2025, Canada formally integrated its Coast Guard into its defense to strengthen maritime security.[122] It is also acquiring a new submarine fleet that can deploy in the Arctic and provide stealth, persistence, and lethality. In August 2025, the government shortlisted TKMS and Hanwha Ocean as vessel suppliers so that by 2035 Ottawa can deploy submarines capable of under-ice Arctic operations.[123]

As an Arctic country, Canada has long cooperated closely with the US on defense because of their common interest in protecting the North American homeland by maintaining up-to-date polar-capable surveillance and response capabilities. Ottawa is therefore part of key initiatives and operations, such as the ICE Pact and NORAD modernization. Through air and maritime patrols, icebreaker expansion, ISR investments, and a future submarine fleet, Canada is reinforcing North American Arctic sovereignty. These capabilities will remain essential and will secure Canada's position as a core US regional ally.

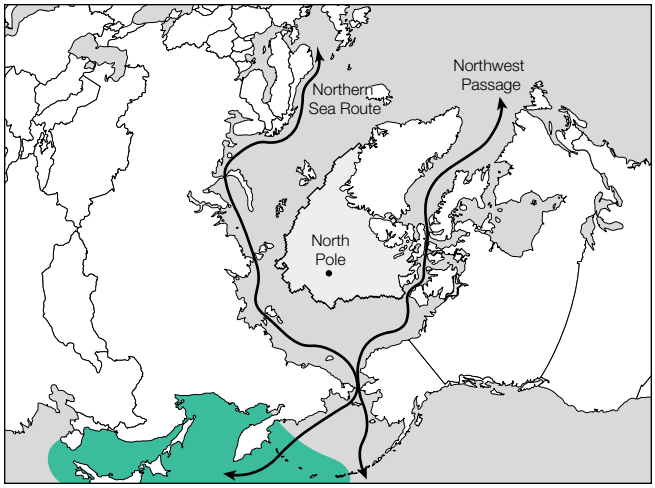
Indo-Pacific Partners

Japan and South Korea have long-standing Arctic interests. Both have operated research vessels in the Arctic since the 1990s. And both are members of the International Arctic Science Committee and operate research stations on Svalbard, the strategically important Norwegian archipelago at the convergence of the Arctic and Atlantic Oceans. As permanent observers of the Arctic Council since 2013, they have opportunities to legitimately pursue their Arctic interests. Since 2012, the two countries have recognized that the Northern Sea Route will allow them to further their shipping and energy interests, though they also understand it can pose challenges to the US and its allies. Japan and South Korea's growing shipping interests and their strategic location on the western edge of the North Pacific increase their interest in the Arctic defense force posture of NATO allies.

Japan

Japan is located in the North Pacific at the entrance to the Sea of Okhotsk near Russia's primary nuclear submarine bases on the Kamchatka Peninsula and its Pacific bastion defense (for

Map 13. Japan's Arctic-Relevant Interests



Source: Author.

the range of Tokyo's Arctic interests, see map 13). The country began conducting Arctic research in 1957 and is one of the high contracting parties to the Spitsbergen Treaty of 1920, now called the Svalbard Treaty, which recognizes Norway's sovereignty over the strategically important Svalbard Archipelago. Japan has operated a research station in Svalbard since 1991 and an Arctic research vessel in summer since 1998. It has also operated an Antarctic icebreaker since 2009. In 2021, Japan began building its first Arctic research icebreaker, which is slated to set sail in 2026. The vessel will allow it to conduct year-round missions with international personnel. Japan's 2019 economic partnership agreement with the European Union has increased its shipping interests in the Northern Sea Route along Russia's coastline as melting sea ice allows for more traffic. The route is 40 percent shorter than going through the Suez Canal, which is the default sea route between Japan and Europe.[124] The Japanese seaport of Tomakomai is a potential maritime hub for Asian companies contemplating using the Northern Sea Route.

The North Pacific, which encompasses the Bering Sea entrance to the Arctic, was a front line during the Cold War in East Asia. During this time, the Japan Maritime Self-Defense Force worked closely with the US Navy on antisubmarine and naval surveillance operations directed at the Soviet Union. So Japan has had vested interests in Arctic defense for decades, and in line with this strategic outlook, Tokyo has stressed the importance of coordination with the US and Canada to deter aggression and ensure freedom of navigation.[125]

In 2024, the Japanese government laid out a diplomatic initiative to strengthen cooperation with Iceland, Norway, Finland, Sweden, and the Kingdom of Denmark on security and defense, science and technology, and Arctic Ocean issues. They agreed that a free and open Arctic Ocean is important for countering Russia and China's growing regional role. Japan and the Nordic countries share the view that European, Atlantic, and Indo-Pacific security are inseparable.[126]

Japan collaborates with the US on countering possible coordinated nuclear confrontations with Russia and China. Meanwhile, the countries have other opportunities to cooperate in developing long-distance surveillance capacities, such as polar underwater vehicles that can navigate autonomously and host cameras, sonars, and communication devices. By working together, they might also overcome challenges like developing batteries and energy sources that allow these systems to operate over long distances, and space communication tools that allow data transmission in extreme Arctic weather conditions.[127] Japan has also begun producing ice-class vessels that can increase allied presence on the Northern Sea Route, thereby improving situational awareness.[128]

Japan has significant submarine, surface, and air force capabilities, including maritime patrol aircraft, fighter aircraft, and minesweepers. As part of its $60 billion fiscal year 2026 defense budget, Tokyo will procure land, surface, underwater, and aerial uncrewed systems, which will help it conduct surveillance operations and counter surface and amphibious forces.[129] These capabilities are essential to combat-credible aerial, surface, and

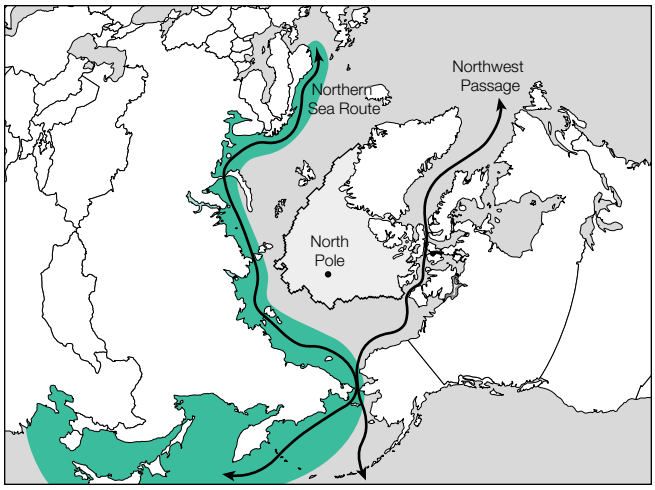
subsea forces that can work with the US to counter Russian and Chinese wartime operations and help penetrate Russia's bastion defense in the Sea of Okhotsk.

Recent Japanese announcements indicate that Tokyo is serious about playing a defense role across the Arctic region with a wide range of NATO allies. In addition, Japan's defense industry has capacities that can prove key to Arctic surveillance operations. Integrated joint operations of US submarine forces and the Japan Maritime Self-Defense Force are essential to demonstrate an allied ability to penetrate Russia's Pacific bastion defense and engage Russian and Chinese forces in wartime operations. However, Japanese defense cooperation on Arctic issues requires a strong demand signal from the US that the region should be a priority for North Pacific allies.

South Korea

South Korea is located in the western part of the North Pacific, next to the Yellow Sea, the East China Sea, and the Sea of Japan (for Seoul's Arctic interests, see map 14). After establishing a research station in Norwegian Svalbard in 2002, South Korea began conducting Arctic research in earnest. Since 2009, the country has operated an Arctic research vessel, and a next-generation icebreaking research vessel is under construction, which is expected to be completed by 2029.[130]

Map 14. South Korea's Arctic-Relevant Interests.



Source: Author.

The port city of Busan in the south connects South Korea to major Pacific ports and is a potential hub for Asian shipping companies that plan to use the Northern Sea Route. Compared to sailing through the Suez Canal, this route can save up to 10 days of travel time and lower fuel costs by approximately 25 percent. If rerouting shipping lanes toward the Northern Sea Route becomes viable, Busan could handle up to 85 million tons of cargo annually.[131]

With a 22 percent share of new orders in 2025, South Korea is a global shipbuilding hub; only China surpassed it with 58 percent of new orders.[132] South Korean shipbuilders have specialized in constructing ice-capable liquefied natural gas (LNG) carriers and polar-ready tankers, and they built all 15 ice-capable carriers for Russia's Yamal LNG 1 project.[133] The bipartisan US Ships for America Act, which as of this writing is being considered in Congress, aims to revitalize the US shipbuilding industry. South Korean shipbuilders are investing $150 billion to help the US with the effort, including support for its Navy fleet. Polar security and infrastructure are other areas of potential collaboration.[134]

The state-backed Korea Ocean Business Corporation has announced plans to launch a dedicated fund for new-build maritime projects that focus on realizing Arctic shipping potential.[135] The plans include merging the ports of Busan and nearby Ulsan with the shipbuilding sector to build an industrial cluster for ice-capable ship construction, port operations, and sustainable marine fuels. South Korean Ocean and Fisheries Minister Jeon Jae-soo has announced that the government plans to launch a test container service through the Arctic in 2026.[136] A South Korean Arctic container route could complement Russian and Chinese plans for year-round Northern Sea Route container shipping and the dual-use activities those may involve.

Seoul announced that it would cooperate with allies and partners on Arctic deterrence and defense when it stressed the importance of coordination with the US and Canada to deter aggression and ensure freedom of navigation in the region.[137] South Korea also works with the US to counter possible coordinated nuclear confrontations with Russia and China, and undersea monitoring and response operations could be another avenue of cooperation. South Korea is developing autonomous underwater systems for reconnaissance, naval mine, and ASW operations that could be done over long distances in remote regions such as the Arctic (provided these systems can operate in ice-filled waters),[138] which could help the US and its allies. In addition, the country has surface capabilities for air defense and submarine hunting that are useful for detecting, tracking, and intercepting missiles and submarines. The 2025 US–South Korea nuclear-powered submarine deal could also potentially strengthen Seoul's contribution to Arctic-related security and surveillance missions by boosting its endurance, ASW reach, and undersea surveillance contributions.[139]

South Korea's ability to contribute to defense and deterrence in the Arctic originates from its defense industrial capacities as a builder of ice-capable vessels and autonomous systems for military and dual-use purposes. The capabilities that South Korea can bring to the table have the potential to match China's economic and technological contributions to Russia's dual-use and military force posture in the Arctic. However, as is the case with Japan, for cooperation on Arctic issues to succeed, the US will need to send a strong demand signal to South Korea that the region should be a priority.

5. ARCTIC WARGAME: THE USEFULNESS OF MILITARY TECHNOLOGY IN THE MAKING

Hudson Institute's Center for Defense Concepts and Technology conducted a wargame set in the 2035–40 time frame to assess the implications of changing Arctic threats and strategies for allied force design. Although it addressed strategies for Arctic operations, the wargame mainly focused on new capabilities allied fleets could employ to both deter aggression and conduct combat operations in and around the Norwegian and Barents Seas and along the Northern Sea Route.[140] The wargame provided insights regarding how allies and partners can best allocate resources for defense investments for greatest effect in hybrid warfare, escalation phases, and full-scale combat.

Arctic Wargame Assumptions and Tasking

The wargame scenario assumed that Russia (Red) was the aggressor and the allied force (Blue) consisted of units from the United States, United Kingdom, Norway, Kingdom of Denmark, Japan, and South Korea. The scenario postulated that the war in Ukraine had transitioned into a protracted low-intensity conflict. Seeking to break NATO and European support for Ukraine, Russia intensified its campaign of gray-zone warfare against NATO Baltic countries, Moldova, and Romania. Moscow coordinated these actions with Iran and its proxies, who conducted operations against Red Sea shipping. As a result, shipping increased along the Northern Sea Route, which the wargame assumed was ice-free from August through October. The simulation was set in the summer months, limiting the ability to test the usefulness of icebreakers and ice-hardened vessels.

To dissuade NATO from supporting Ukraine, Russia threatened incremental escalation against NATO by deploying a large fraction of its nuclear submarine fleet to the North Atlantic. The deployment included modified Oscar II–class submarines that carried Poseidon nuclear-armed drones and Yasen-class SSGNs.

Photo: A US coast guardsman and a research engineer pull a Seaglider autonomous underwater vehicle aboard a small boat from the USCGC *Cutter Healy* while operating in the Arctic Ocean on August 5, 2025. (US Coast Guard)

Russia needed unimpeded access to the Atlantic for these submarines to reach potential launch positions near NATO countries without being detected, encouraging Moscow to defeat allied surveillance capabilities like the Fixed Distributed System (FDS). Russia used submarines, support ships, and robotic and autonomous systems (RAS) to disrupt FDS arrays and other undersea infrastructure in the Norwegian Sea. The scenario assumed that Russian air forces were supporting armed incursions in Moldova and Latvia so were constrained in the Norwegian Sea and surrounding areas.

Russia also threatened to interdict Northern Sea Route shipping if Japan and South Korea took diplomatic or economic action against Moscow. And with Red Sea shipping lanes also under attack, shipping companies started to redirect their vessels to the Cape of Good Hope.

Blue's initial rules of engagement (ROE) reflected allied governments' desire to avoid escalation. Its forces were allowed to use kinetic force against Red RAS and could only use kinetic and non-kinetic actions against Red crewed forces in self-defense. Within these ROE, allied forces were initially tasked with protecting undersea infrastructure, tracking Red naval and coast guard vessels, eliminating Red RAS from the region, and protecting allied shipping from interdiction. During the confrontation's first phase, Red successfully degraded systems providing space and surface surveillance data, disconnecting half of the FDS in the Norwegian Sea. Red maintained its undersea reconnaissance capabilities, including its RAS, in the Norwegian Sea and announced that its surface forces in the Northern Fleet would use lethal force to protect its vessels in this area.

As the conflict moved into its second phase, Blue re-tasked its forces based on the assumption that Red SSNs and SSGNs were moving toward the GIUK Gap. Blue forces continued to protect allied undersea infrastructure and attempted to eliminate all Red RAS from the Norwegian Sea. But they adjusted their posture to hold Red crewed naval and coast guard vessels at risk, and to track and prepare to engage Red submarines. Along the Northern Sea Route, Blue forces continued to protect allied shipping and tracked Red naval and coast guard vessels. Blue commanders expected combat, so they changed their ROE in the Norwegian Sea to allow attacks on any Red SSN and SSGN once Red had engaged Blue.

As the scenario entered its third phase, Red submarines began to engage Blue surface forces, which received support from a small contingent of strike and surveillance aircraft. Red attacks on undersea infrastructure had completely shut down the FDS in the Norwegian Sea, forcing Blue to rely on deployed forces to surveil and target submarines. Red interdictions had stopped all traffic on the Northern Sea Route, except for Russian and Chinese transits. With combat underway, Blue ROE allowed the allies to engage Russia's naval forces operating in the Norwegian Sea. However, Blue forces only sunk a few enemy submarines, with two of the three Blue teams sinking an SSN each, allowing Red to succeed in its game objectives.

Available Forces

Table 4 lists the maritime and aerial forces available to Red and Blue forces. It does not include Canadian contributions because they are likely to remain in the Atlantic Ocean and Bering Sea, insofar as they remain predominantly coast guard forces and hence are not suitable for forward deployment.

Players were divided into three Blue teams to test the value of adding icebreakers and different mixes of uncrewed systems to each team's inventory (see table 5). Although the Blue force included units from multiple allied nations, each Blue team played as a unified allied force to avoid national bias and facilitate out-of-the-box thinking on the deployment and posturing of forces.

For the total number of losses that the Blue and Red forces suffered during the wargame, see figures 1 and 2.

Table 4. Baseline Blue Forces in Wargame

ASSETS	RED (RUSSIA)	BLUE (UNITED STATES, UNITED KINGDOM, NORWAY, DENMARK, JAPAN, AND SOUTH KOREA)
CVN		1
DDG	3	5
FFG/M	5	7
FFL	4	
Coast Guard	4	5
Surveillance	4	4
MCM		4
Logistics	1	3
Icebreaker	2	6
Patrol		9
PCG		2
PC		3
OPV		5
OPV-hardened		2
SUSV		3
Sail-USV	3	3
SSP	4	3
MUSV	10	
sUSV x10	5	
SSGN/BN	1	1
SSN-VPM		1
SSN	5	2
XLUUV	10	
SUUV x10	5	
Fighter/CV-fighter	24	48
MPA	3	24
Tanker		6
AEWC/CV-AEWC	2	9
MALE	3	15
HALE		2
SR sUAV		100
SR sUAV x25		4
LR sUAV		10
LR sUAV x5		2

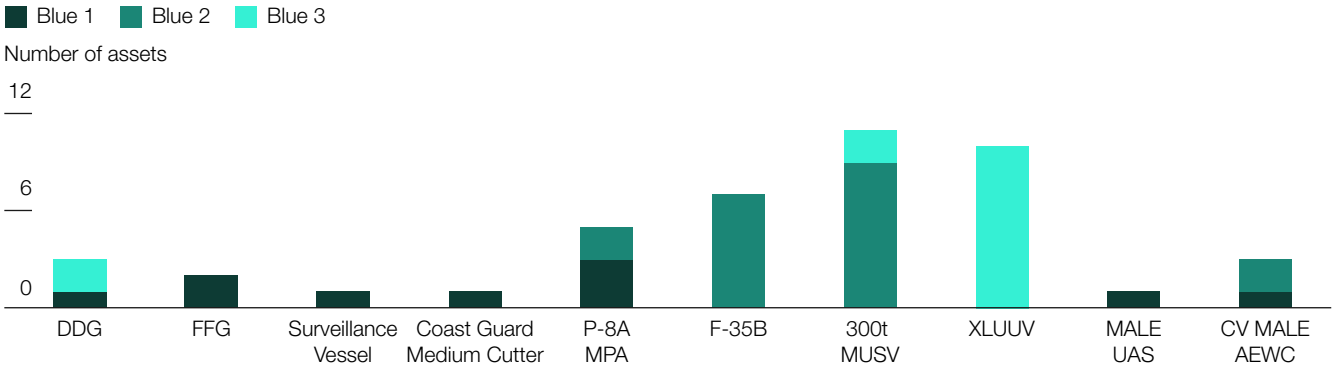
Source: Author and contributors.

Table 5. Variations on Baseline Force for Each Blue Team

	TEAM 1: ICEBREAKER	TEAM 2: LARGE RAS	TEAM 3: SMALL RAS
Surface	1 icebreaker and 1 medium coast guard cutter	20 300t MUSVs and 50 Sail USVs	10 300t MUSVs and 10 vsUSVs x10
Undersea		20 XLUUVs	15 XLUUVs, 20 MUUVs x5, and 50 SUUVs x10
Air			40 SR sUAVs x25 and 20 LR sUAVs x5

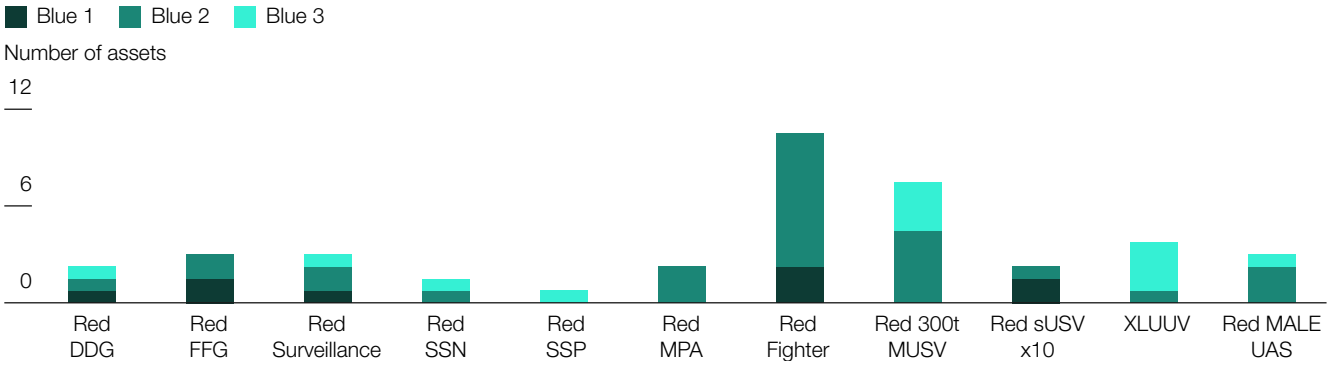
Source: Author and contributors.

Figure 1. Total Blue Team Losses



Source: Author and contributors.

Figure 2. Total Red Team Losses



Source: Author and contributors.

Lessons Learned

The wargame involved only a few rounds of engagement. For this reason, the outcomes are small and limited, and we cannot draw strong conclusions. Nevertheless, the three teams' discussions during the wargame, the outcomes of their decisions, and the participants' concluding remarks resulted in the following tentative lessons learned.

1. Infrastructure investments are critical.

The GIUK Gap is the main maritime route for Russia's Northern Fleet ships and submarines to reach the Atlantic. US allies need robust ports, airfields, and supply depots to sustain operations in this harsh environment. The Arctic environment poses severe challenges such as ice, storms, limited daylight, and extremely cold weather. Infrastructure such as ice-hardened ports, fuel storage, and repair facilities ensures that ships and aircraft remain operational. Long-term sustainment requires prepositioned supplies such as fuel, ammunition, and spare parts; medical and evacuation facilities; and rapid repair capabilities for ships and aircraft damaged in combat or by the environment. Moreover, infrastructure for air bases and missile defense systems in the UK, Iceland, and Norway is essential to protect SLOCs and allied forces from Russian long-range strikes.

ASW infrastructure, such as maritime patrol aircraft bases and undersea sensor networks, is needed to counter the Northern Fleet, which operates advanced submarines from bases near Murmansk. Without such allied capabilities, Russian submarines can threaten transatlantic shipping and reinforcement routes.

The wargame was played as a series of multi-day "snapshots" over months of protracted warfare, allowing only for limited conclusions on the importance of sustainment operations. However, it revealed the need for base and repair infrastructure that could support operations by lower-endurance RAS or enable repairs and maintenance for vessels and aircraft damaged by combat or sea conditions.

Infrastructure shortfalls proved especially problematic during the conflict's third phase when Blue tried to establish sea control and carry out ASW operations without FDS. These gaps especially impacted Blue Team 1, which had limited RAS that could perform ASW (e.g., MALE UAVs and sail USVs). As a result, Team 1 lost several crewed surface warships to submarine attack and failed to prosecute any undersea targets. Teams 2 and 3 had more RAS with ASW capabilities, such as medium uncrewed surface vessels (MUSVs), extra-large uncrewed undersea vehicles (XLUUVs), and deployable sensors, which enabled them to gain more undersea detections and engagements.

2. Uncrewed systems for ASW and ISR are essential.

The wargame data indicate that allied forces prioritized air and surface operations, while ASW sensing and prosecution were often under-resourced. Teams conducted surface and air surveillance and targeting with fighters, carrier aviation, HALE and MALE UAVs, and airborne early warning and control (AEWC) aircraft. Blue Teams 2 and 3 devoted MUSVs and XLUUVs to ASW, providing them with more detections. However, both teams relied on crewed assets such as P-8As to prosecute undersea targets. These results suggest that Blue teams needed more ways to engage submarines using RAS.

The wargame indicated that RAS, especially sail USVs and MUSVs with sensor payloads, can play a critical role in ISR operations. Because sail USVs are powered by wind, solar, or diesel, they can conduct long-duration missions without refueling. Their low profile and autonomy make them hard to detect and cost-effective compared to crewed ships. They can patrol vast ocean areas for months, even in Arctic conditions, collecting acoustic data for submarine detection as well as radar and Automatic Identification System (AIS) data for surface vessel tracking, and meteorological and oceanographic data to support operational planning.

Sail USVs are well-suited for summer and autumn, which is when the wargame took place. In winter and early spring, they would

have to rely on wind or diesel power due to the lack of sunlight. However, sail USVs cannot operate in ice. For a forward-operating adversary such as Russia, the Arctic winter months could provide a window to move strategically under reduced detection, especially by using submarines or surface forces.

MUSVs are autonomous or remotely operated ships designed for persistent maritime operations without onboard crew. MUSVs can operate for weeks without resupply and are generally diesel-powered. Larger MUSVs can carry weapons, such as the US Navy's planned Modular Attack Surface Craft.[141] All MUSVs can carry modular payloads for ISR, including radars, electro-optical and infrared (EO/IR) sensors, passive sonars, signals intelligence, and AIS receivers. Sensor payloads for multi-mission ISR allow MUSVs to track Russian submarines, detect and geolocate Russian radar and communications for targeting and electromagnetic warfare planning, and monitor ice drift and sea state for fleet movement planning. Multiple MUSVs can create a mesh network, covering chokepoints like the GIUK Gap and approaches to Murmansk, to feed real-time data to NATO maritime operations centers via secure satellite links. If lost, MUSVs pose minimal strategic risk compared to crewed platforms. These vessels would need to navigate around heavy ice, as building an ice-capable MUSV is likely not cost-effective.

Teams 2 and 3 gained multiple undersea detections of uncrewed underwater vehicles (UUVs) or SSNs using MUSVs, MALE UAVs, and sail USVs. The wargame adjudication may have been overly optimistic regarding the probability of detection (Pd) for sail USVs. However, even with a lower Pd, an allied force could deploy sail USVs in sufficient numbers to gain detections in chokepoints like the Bear and GIUK Gaps. Critically, these systems can add resiliency to the undersea surveillance apparatus and shift the risk–reward calculus for adversarial seabed warfare operations.

Team 2 suffered no losses of crewed surface warships, while Team 1 lost three and Team 3 lost two. Teams 2 and 3's ability to rely on RAS for ISR and targeting operations close to enemy forces contributed to these results, with team 2 having the more effective combination of RAS for ISR and targeting in the wargame. The allies lacked extremely long-range surface-to-air missiles and had a limited ability to contest airspace, but long-endurance aerial targeting platforms showed they could fill the anticipated gaps in space coverage.

3. Uncrewed systems facilitated, but did not conduct, offensive operations.

Uncrewed systems can significantly enhance offensive operations by providing persistent ISR, enabling precision strikes, and reducing risk to high-value crewed platforms. Small uncrewed surface vehicles (sUSVs) are valuable in offensive operations in the Arctic because they can provide persistent ISR and maritime domain awareness at the ice edge.

MALE and HALE UAVs are critical in Arctic warfare because they provide persistent ISR over vast, remote areas where crewed patrols are costly and infrastructure is scarce. Their long endurance allows continuous monitoring of maritime chokepoints, ice edges, and seabed infrastructure, even in poor visibility, using EO/IR and synthetic aperture radar sensors. They enable precision strikes by acting as spotters for long-range weapons, reducing risk to surface ships and crewed aircraft. HALE UAVs can also serve as airborne communication relays when satellite links degrade at high latitudes, ensuring connectivity for dispersed forces. They can also augment ASW patrols by deploying sonobuoys or integrating acoustic sensors. Cold-weather performance and electromagnetic warfare vulnerability remain challenges.

Team 1 adopted an aggressive posture early in the hybrid and escalation phase, but its uncrewed surface presence was small. It deployed only two sail USVs per turn. Team 1 did not employ air-independent propulsion submarines (SSPs) for torpedo attacks, leaving a key offensive capability unused. Instead, the team deployed MALE UAVs at scale and lost one MALE plat-

form during the game, indicating some reliance on this asset for domain awareness. MALE UAVs did not serve as primary spotters in kill chains. The reliance on limited uncrewed systems increased risk to high-value platforms such as the UK carrier strike group, which remained central to Team 1's operations and absorbed losses in the escalation phase, highlighting the risk to high-value platforms in later phases. Despite the deployments, Team 1 lacked a robust ISR and ASW architecture, and offensive operations resulted in the loss of two frigates and one destroyer. The team did successfully target multiple Russian surface assets, such as sUSVs units, during strike phases.

Team 2 illustrated the broader potential of uncrewed systems. It deployed most of their sail USVs per turn and achieved several undersea detections, while its HALE and MALE UAVs acted as primary spotters in multiple long-range anti-ship missile engagements. These uncrewed platforms facilitated the delivery of precision strikes and the maintenance of situational awareness without exposing major surface units. Underwater targeting and C2 were challenging. Reloading assets would also be difficult with the current Arctic infrastructure, which further illustrates that infrastructure upgrades are essential for sustaining operations in the High North.

4. White hull assets are useful for escalation management in pre-combat phases.

The teams opted to use coast guard vessels to protect the 12 ally-friendly ships that were caught on the Northern Sea Route during the escalation phase. The challenge is that Russia might confront grey hull assets attempting to escort civilian vessels to safe areas. In the escalation phase, allied navies would have difficulty separating the task of protecting civilian vessels along Russia's Arctic coastline from the objective of tracking all Russian naval and coast guard vessels and RAS. This could provoke Russia into more offensive missions. The Northern Sea Route is narrow, and Russia monitors it heavily. In the wargame, NATO airpower was far away, with carriers positioned in the GIUK Gap or in the middle of the Norwegian Sea, allowing for limited air cover. As a result, merely opting for a strategy of ordering the civilian ships to disperse and move toward neutral or friendly Arctic waters via the shortest ice-free route might result in Russian strikes.

5. Crewed systems will still be important in future Arctic warfare.

Despite the advantages of uncrewed systems, all teams found that crewed systems were still key in countering enemy forces in the hybrid and escalation phases, when the focus was on sea denial, as well as in the full-scale combat phase, when the focus was on sea control. The allies could achieve sea control by denying Russia freedom of maneuver in the Arctic while ensuring that NATO forces could move and protect SLOCs. Russia would most likely not want to go on the offensive in both the Baltic and the Norwegian Seas. However, the Arctic would remain central to Russia because it offered alternative routes for its naval forces and was a staging area for strategic forces such as SSGNs and long-range missiles. To successfully defeat Russia, the allied forces were encouraged to strike first and be on the offensive to drive Russia toward the north to defend its submarine bastion by the Kola Peninsula. ASW, surface and air superiority in key choke points such as the Barents Sea and the GIUK Gap, and continuous surveillance and targeting were considered essential for achieving the objective.

SSPs excelled in acoustically cluttered shelves and fjords, and they are ideal for launching ambush torpedo shots, mining, and denying access. Blue teams used SSPs to inflict significant damage on Red surface forces. Blue teams also used SSPs to covertly monitor Russian naval movements, submarine activity, and coastal defenses. Compact subs are well-suited for seabed operations and infrastructure sabotage, such as reconnaissance and effects against cables, pipelines, and seabed sensors. These vessels can also support cyber and electromagnetic warfare operations by acting as forward nodes. Furthermore, the allies can use SSPs to provide real-time targeting data for surface and air strikes, or use them as covert staging

platforms for raids on Russian radar or missile sites. The vessels can launch cruise missiles against high-value targets such as air defense systems, command centers, and logistics hubs, as well as provide precision strikes without exposing surface ships to Russian A2/AD systems.

Crewed platforms such as fighters, destroyers, and frigates did the heavy lifting in damage and engagements, and the carrier air wing was central to both air superiority and surface strike chains. Fighters accounted for around half of Team 2's attacking engagements and more than half of its damage inflicted. Team 2 had numerous attacking engagements with fighters and extensively used air-to-air missiles and long-range anti-ship missiles. Carrier-based AEWCs frequently served as primary spotters. In Team 1, fighters contributed around one-fifth of damage. Frigates accounted for around one-third of Team 2's damage and half of Team 1's. The carrier strike group was active and influential in the attacks. Team 1's SSBN achieved one undersea detection. Maritime patrol aircraft frequently acted as primary spotters in kill chains with destroyers or frigates, emphasizing this aircraft's role in targeting. Multiple destroyer and frigate attacks caused high damage to Red ships. For those allied forces with additional uncrewed systems, they would assist with ISR, detection, and targeting. Team 2 successfully used sail USVs and MUSVs for undersea detections. Team 1 executed one-way attacks with long-range small UAVs, though with limited damage, and Team 3 used them in kill chains for targeting.

Whereas icebreakers proved useful during the hybrid phase of the conflict, none of the teams found icebreakers useful during the combat phase, presumably because the wargame took place during the ice-free period in the summer months. During combat in months with sea ice in the areas of operation, icebreakers would be critical for several supportive functions for establishing sea control. Icebreakers can serve as logistics enablers, supporting replenishment ships and amphibious forces moving through ice-covered regions, and can maintain open lanes for under-ice ASW operations and sensor deployment. These vessels can also host uncrewed aerial systems and sensors for ISR and act as forward command nodes in ice-filled areas where other crewed vessels cannot operate. Icebreakers can deploy and recover UUVs and USVs in ice-heavy zones and provide battery recharge and maintenance for autonomous systems. They are also essential for crew recovery and assistance for damaged ships in areas with heavy ice.

Some team players questioned if full-scale warfare would be likely because maneuvering effectively with surface vessels would be difficult in areas with ice, even when operating with icebreakers, which would become easy targets for subsurface and air threats. Towed sonar equipment in general is complex to deploy in the Arctic because it is susceptible to damage from ice. In the Arctic environment, ASW is best done with seabed systems such as FDS and systems in the water column such as UUVs and submarines. Maritime patrol aircraft are useful as spotters, and helicopters dropping sonobuoys can be used for detection in relatively ice-free areas.

All teams deployed surface ships such as offshore patrol vessels equipped with sensors, indicating that they will remain important. Such ships can be used for long- and short-range air defense, ISR, and C2, as well as for deploying RAS by the ice edge farther from the enemy. Ice-hardening these vessels and equipping them with air defense would allow them to operate in areas where ice may be encountered and make them survivable, provided they can communicate with UUVs that provide undersea protection. Ice-hardening allows surface vessels to have a lifecycle corresponding to ordinary vessels, provided maintenance and repair facilities for polar conditions are available. At present, communication between surface vessels and UUVs in ice-filled areas is challenging. However, because of the usefulness of deploying teams of crewed and uncrewed systems, communication constraints may be solved within the next decade. Ice-hardened vessels with air defense capabilities could also protect themselves and other assets against Russian

aircraft or cruise missiles, providing an air defense umbrella for uncrewed systems, logistics ships, and icebreakers.

Coast guard cutters are white hull but can deter small craft, sabotage, or hybrid warfare tactics. So they are ideal for overseeing law enforcement, conducting patrols, and countering anti-surface threats. Equipped with radar and communications systems, they can monitor surrounding waters and carry boarding teams and light weapons for close protection. These features allow coast guard cutters to escort civilian ships with a non-escalatory deterrent, since if Russia were to attack, it would trigger NATO's Article V collective defense obligation. Deploying a couple of coast guard cutters for the escort mission would also not require diverting too many essential assets from the Norwegian Sea region.

In addition, Team 1 deployed a surveillance ship along the Northern Sea Route. This vessel was deployed slightly ahead of or on the flank of the other ships, scanning for threats. Equipped with radars, sonar, and electronic intelligence systems, it could detect Russian submarines, surface vessels, and aircraft far beyond cutters' range. The surveillance ship could also provide real-time threat updates to coast guard vessels, enabling proactive maneuvers. It could jam or spoof Russian targeting systems, reducing the risk of Russian missile or torpedo attacks, and act as a communications hub to maintain secure links between cutters, civilian ships, and NATO command. The surveillance ship was less provocative than a grey hull ship, but the platform still provided critical intelligence and coordination. Its forward deployment carried risks, as demonstrated by Team 1's loss of the surveillance ship deployed on the Northern Sea Route in the escalation phase in turn 2.

6. The allies need to develop new assets to prepare for future Arctic warfare.

The main lesson from the Arctic wargame was that submarines, uncrewed systems, and crewed vessels are all necessary for responding successfully to hybrid and full-scale warfare threats in an ice-filled region where ASW, ISR, targeting, maneuverability, and sustainment will likely remain challenges in the coming years. The wargame and the limitations of the warfare scenario, such as the summer setting, suggested that several technological developments are needed to operate effectively in the Arctic, including the following:

- Climate-resilient infrastructure
- Ice-hardened multi-mission crewed vessels
- Polar-capable undersea surveillance, communications, and targeting systems
- Autonomous systems capable of redefining their objectives in theater
- Polar-capable satellite surveillance and communications systems
- Recovery technology for uncrewed systems
- Polar-capable surface, undersea, and aerial sensors
- Polar-capable aircraft

6. WHAT REMAINS TO BE DONE

Based on the preceding analysis, NATO allies and partners have much work to do to defend and deter aggression in the Arctic. Although Russia's war in Ukraine has taken a toll on its capabilities, the Arctic has become more prominent in Moscow's strategic planning. Wanting to remain a leading power, the Kremlin is focused on developing long-range hypersonic and cruise missiles, and it is expanding its Arctic basing and dual-use infrastructure. This will create maneuvering space for SSBNs, SSGNs, and SSNs as well as options to contest allied SLOCs and ISR. Russia's strategic focus allows it to pose a formidable hybrid and military challenge in the Arctic.

China's growing dual-use presence—which includes satellites, polar-capable vessels, and science and logistics networks—amplifies the challenge and creates pathways for Russia-China strategic coordination. Chinese contributions help Russia maintain a combat-ready military for the Arctic. Joint exercises with China signal that they are cooperating on Arctic defense and deterrence and are prepared to assist each other in the event of military conflict in the Bering Sea. In the Barents Sea region, dual-use cooperation does not overtly involve the Chinese military in a prominent role. However, China is building capabilities to operate across the Arctic independently of Russia, provided it has port access along the Northern Sea Route. Should Beijing's priorities change, it can play a military role in the Barents Sea region in the future.

How can NATO and its partners establish credible defense and deterrence from the Barents Sea to the Bering Sea region? In brief, members of the alliance and their close partners will need

Photo: US marines use a tactical resupply uncrewed aerial system to conduct a resupply during Exercise Nordic Response 24 in Alta, Norway, on March 12, 2024. (US Marine Corps)

to field resilient sensing and strike networks, combine crewed and uncrewed teaming above and below the ice, and align industrial, legal, and political instruments to sustain readiness in extreme conditions.

Integrated Deterrence

The first priority should be creating an integrated deterrence architecture. One element in such an architecture is strategic missile defense at both the Barents Sea and Bering Sea flanks to mitigate the complex nuclear threat. A combination of land- and sea-based ballistic missile defense on both ends of the Arctic region can establish this. On the Barents Sea side, in eastern Greenland, coastal radars and discrimination sensors for early warning, tracking, and cueing are needed. The allies can integrate these with a more robust space ISR layer to close surveillance gaps over Greenland and the North Pole. On the Bering Sea side, the US and Canada should continue to modernize their ballistic missile defense. Furthermore, the allies should integrate Japanese and South Korean sea-based ballistic missile defenses into their exercises to complicate Russian and Chinese nuclear signaling from the Pacific–Arctic approach.

In addition to improving missile defense, the allies need to develop resilient satellite-based communication for C2 as well as resilient positioning, navigation, and timing to improve GPS accuracy, navigation, and synchronized operations at high latitudes. Such modernization could involve combining satellites in geosynchronous earth orbit for global coverage, low earth orbit for polar coverage, and medium earth orbit for navigation to ensure coverage even when one layer is degraded. The modernization effort should also develop anti-jamming measures such as frequency hopping, encryption, and hardened terminals. Finally, the allies and their partners need to rely on direct satellite communication instead of ground stations and enable mesh networks so that if one link is jammed, data can reroute through others. Such modernization efforts would allow the allies to sustain C2 under disruption.

An integrated deterrence architecture could also include undersea domain awareness and bastion containment. To improve undersea domain awareness, the allies can expand the seabed-to-space sensor architecture through fixed seabed arrays, acoustic tripwires, deployable UUV relays, and persistent USV and UUV patrols to detect and track Russian and Chinese submarines. Bastion containment would require containing Russian forces near their Barents Sea bastion and at the Sea of Okhotsk in the North Pacific. This would prevent a breakout into the Norwegian Sea and the Bear Gap, and would raise Moscow's cost of expanding its SSBN sanctuary.[142]

A New Force Design

The second priority should be implementing a force design consisting of crewed and uncrewed teaming in layers. The design would use uncrewed systems to detect, track, and degrade or destroy enemy forces, backed by crewed submarines, surface combatants, and aircraft held in positions of advantage for decisive action and C2.

The force design's undersea layer should have three elements. Small, medium, and large UUVs can conduct covert ISR, barrier patrols, and weapon launches, provided this is politically feasible. The allies can use SSN and SSK attack submarines for ambush, prosecution, and deterrence near the bastion flanks at the Barents Sea and the Sea of Okhotsk and near the choke points at the Barents and Bering Seas approaches and in the GIUK Gap. To ensure under-ice communication and navigation, the force design will require investments in acoustic modems, optical and acoustic hybrid links, inertial and terrain-aided navigation for when GPS or other satellite signals are unavailable, and ice-tolerant docking and recharge nodes.

The surface layer could also have three elements. The first could consist of ASW frigates and destroyers with towed arrays, variable-depth sonars, torpedoes, and robust self-defense. Second, ice-hardened multimission ships could carry drones equipped with air defense, ISR, and C2 functionalities. These vessels

would operate in ice margins and serve as forward nodes for UUV and USV deployment and recovery. A third element could consist of USVs for persistent ISR, minesweeping, electromagnetic warfare, and acoustic localization. The uncrewed surface vehicles would help reduce the risk to crewed ships.

The aerial layer could include maritime patrol aircraft for wide-area ISR, sonobuoy fields, and kill-chain cueing. ASW helicopters with dipping sonars and torpedoes can close the sensor-to-shooter loop, and the allies would use HALE and MALE UAVs for broad surveillance, communications relay, and persistence in harsh weather conditions.

Cyber and electromagnetic warfare resilience would require hardened drones and C2 networks that can withstand jamming, spoofing, and cyberattacks. C2 architecture should be designed so that the force can still function at reduced capacity in case communications disruptions occur. Logistics and sustainment require establishing forward-operating bases in or near the Arctic Circle with pre-positioned spare parts, ice-capable tankers and replenishment, emergency repair facilities for cold weather, and modular payload support for drones.

Joint Exercises

The third priority should be conducting exercises, adjusting the force posture, and managing escalation. Exercises linking the Bering Sea and North Pacific region and exercises linking the Baltic Sea and Arctic region would mirror Russian and Chinese exercises in the Arctic, Baltic, and North Pacific regions. They would also signal a preparedness and willingness to respond immediately if adversaries start a war. The allies could hold such exercises near Russia's bastion defenses in the Barents Sea within Russia's EEZ, and near the Seas of Okhotsk and Japan, close to Russia's Pacific submarine bases and strategic infrastructure that connects Russia and China. The exercises would raise the costs for challenging the US and its allies in the Arctic and adjacent regions. They could encompass states from northern Europe and the North Pacific on both the Barents Sea and Bering Sea sides of the Arctic to demonstrate solidarity and interoperability across the Arctic. Though these offensive measures would be on a par with Russia-China actions, they could lead to escalatory responses. But a more assertive force posture appears necessary to demonstrate resolve to use force against infrastructure and the capabilities to target opponents' warfighting ability.

If the allies conduct ISR and ASW exercises near Russia's bastions and in its EEZs, escalation management will become important. This could involve clear ROE, messaging, and hotlines to Russia and China to prevent accidents during close encounters. Moreover, exercise planning could involve legal annexes that mitigate miscalculation by defining which activities are permissible under international law, ensuring that treaties are not violated and clarifying thresholds for escalation. Diplomatic annexes can provide communication strategies with adversaries, notification protocols to avoid surprises, and public messaging to explain the defensive nature of exercises and reassure partners.

Detecting and Tracking Submarines

The fourth priority is conducting peacetime submarine detection and tracking. The US, UK, and Norway already field interoperable submarines, maritime patrol aircraft, and uncrewed systems. But the network is not dense or reliable enough across the coast of eastern Greenland, in the Norwegian and Barents Seas, and in the GIUK Gap. Several capabilities can help close these gaps. Ice-hardened patrol vessels with flight decks and hangars, as well as drones for ISR, ASW, and targeting at the ice-edge, would be useful. The allies can use USVs for persistent ISR and acoustic picketing. ASW frigates with modern sensors and weapons can work in tandem with maritime patrol aircraft and helicopters for rapid prosecution. Data fusion and secure sharing across allies would be essential to establish a common tracking picture with cross-domain security guards that would greatly strengthen deterrence of Russian submarine activity.

At the Bering Sea end of the Arctic region, Japan and South Korea can strengthen ISR and ASW against Russian and Chinese submarine activity with large UUVs, maritime patrol aircraft, and sea-based ballistic missile defense. In particular, the allies should establish an ISR chain from the North Pacific through the Bering Sea to establish robust domain awareness across the two theaters.

Industrial Capacity

The fifth priority is enhancing industrial cooperation and capacity. The allies and their partners need to leverage existing production hubs and specialized supply chains. For example, the Nordic countries have the know-how to produce ice-hardened patrol vessels, and Japan and South Korea can manufacture advanced large UUVs. The ICE Pact has already initiated cooperation on icebreaker production. Such initiatives can expand dual-use and military production, focusing on common interfaces, shared spare parts, and training pipelines to accelerate fielding and reduce lifecycle costs.

Resolving Disagreements among Allies

The sixth priority is resolving legal and political disagreements, especially with regard to the Northwest Passage and freedom of navigation. Russia's claims in the Arctic Ocean are likely to result in a greater presence of icebreakers and ice-hardened multimission vessels in areas with multi-year ice. Allies should respond by maintaining a greater presence with similar capabilities in these areas, operating in tandem with updated space capabilities. Since Canada and the Kingdom of Denmark have competing claims with Russia, they are obvious candidates for contributing to such a presence. As an Arctic nation with territory in the Arctic Ocean, the US has obvious interests in participating in coordinated operations to ensure its presence in the area. Ottawa should establish greater presence along Canada's Northwest Passage. Although navigation is much harder here than in the Northeast Passage (where the Northern Sea Route runs), building commercial routes might be feasible if governments support them by providing assets such as icebreakers and helicopters.[143]

Coordinated efforts to patrol this area should also put to rest the disagreement among the US, Canada, and Europe over the status of the Northwest Passage as international or internal waters. Resolving this would demonstrate that practical cooperation takes priority over public legal disputes and would uphold allied deterrence and avoid escalation. Since the Northwest Passage runs through the Canadian Arctic Archipelago, Canada has a stronger legal case for arguing that the passage is internal waters than Russia has for claiming that the Northern Sea Route is internal waters. Nevertheless, it is best to avoid ramping up tensions by bringing the case before the International Court of Justice or by conducting freedom of navigation along the sea route. Instead, allied coordination of navigating the Northwest Passage would demonstrate that allied defense and deterrence take priority over intra-alliance legal disputes. If Russia or China were to transit through the Northwest Passage, the US and Canada should conduct joint monitoring and maintain readiness to enforce safety and environmental rules, signaling unity and capacity without causing a premature legal confrontation. Suppressing disagreement over the status of the Northwest Passage would strengthen the allies' credibility when they conduct lawful operations along the Northern Sea Route and elsewhere.

Linking the Baltic and Arctic Regions

The seventh priority is linking the Baltic Sea region to the Arctic since, like the North Pacific and Bering Sea region, Russian strategic planning and operations are gradually merging them. Here, Swedish submarines, Finnish mine-warfare vessels, and their aerial forces can deny Russia access to the Baltic Sea in wartime and prevent Moscow from carrying out supportive operations in the Arctic. Similarly, together with combat aircraft, Swedish submarine forces and Danish surface vessels constitute a secondary line of defense in Øresund to prevent a Russian breakout to the North Sea and the Arctic. Exercises in the High North can demonstrate preparedness to block Russian access in wartime, would serve deterrence purposes, and may change Russia's calculation of the cost of offensive operations.

Moreover, force posture integration among Finland, Sweden, and the Kingdom of Denmark, with clear seasonal plans for coordinated operations and allocation trade-offs, would improve deterrence and complicate Russian cost–benefit calculus.

Responding to China

The eighth priority is responding to China's dual-use expansion across the Northern Sea Route and its ability to navigate independently across the Arctic if it has port access along the Northern Sea Route. With strengthened commercial and military Russia-China Arctic cooperation, Beijing's presence will grow. China is attempting to make sure it can operate across the Arctic, even if domestic political turmoil roils Russia. China's role and its levels of nonmilitary and military activity in the Arctic are growing. So the US and its allies should establish a dual-use presence along the Northern Sea Route to monitor developments. Such presence can encompass hydrographic surveys, emergency responses, and maritime safety to help monitor activity and shape international norms for transit.

Multiple allies are already doing work that can help respond to China's expansion into the Arctic. South Korea is in an ideal position to fill the ISR gap with its plans to produce ice-hardened containerships and open a container route on the Northern Sea Route. In addition, a South Korean container route would help to manifest freedom of navigation along Russia's maritime coastline. Japan is also developing shipping plans for the Northern Sea Route that could serve similar purposes. Besides the ongoing projects, aligning the allies' space and maritime sensing capabilities to attribute unusual activity and maintain maritime domain awareness along the Northern Sea Route would strengthen responses to China's growing presence.

Timeline for Implementation

The NATO allies and their partners can realize some of these priorities within the next couple of years. In the near term, seabed arrays, deployable USVs, and UUV pickets as well as quick reaction tactics by maritime patrol aircraft, helicopters, and frigates can mitigate ISR gaps. Cross-domain data fusion is also a potential near-term objective, as is exercise-based integration with Japan and South Korea, provided the political will is in place. On the logistics side, ice-capable replenishment, pre-positioned spare parts, and cold-weather repair kits can be available within a couple of years.

Other priorities will take two to five years to realize. These include fielding ice-hardened multimission ships, large UUVs, USV swarms, under-ice communication and navigation nodes, and expanded space resilience. Industrial co-production lines and common interfaces and training will also take up to five years to establish.

Finally, long-term priorities taking five to ten years to implement include mature seabed-to-space architecture, scaled crewed and uncrewed teaming, and distributed C2 that can fight through disruption.

Conclusion

Credible Arctic deterrence hinges on layered sensing, crewed and uncrewed teaming, and resilient logistics and space systems, backed by industrial capacity and political unity. By phasing investments, exercising smartly, and managing legal-political frictions, the US and its allies can raise the risks and costs for opponents contemplating coercion or conflict in the Arctic, while preserving freedom of navigation and preventing full-scale warfare. The US and its allies urgently need to develop a long list of Arctic capabilities. To make matters more difficult, the United States is the only allied country with interests that span the entire Arctic region. This study demonstrates that allied cooperation on defense force postures and acquisitions is necessary to build credible deterrence and defense. These efforts should ensure that limited high-cost capabilities operating under extreme conditions and over long distances constitute credible readiness for full-scale warfare. Only in this way can the US change the risk and cost calculus of opponents contemplating expanding their military force posture in the Arctic.

ABBREVIATIONS

A2/AD: anti-access/area-denial

AEWC: airborne early warning and control

AIS: Automatic Identification System

ASW: antisubmarine warfare

C2: command and control

DoD: US Department of Defense

EEZ: exclusive economic zone

EO/IR: electro-optical and infrared

FLF: Forward Land Forces

GDP: gross domestic product

GIUK: Greenland–Iceland–United Kingdom

GPS: Global Positioning System

HALE: high-altitude long-endurance

ICE Pact: Icebreaker Collaboration Effort Pact

ISR: intelligence, reconnaissance, and surveillance

LNG: liquefied natural gas

MALE: medium-altitude long-endurance

MASC: Modular Attack Surface Craft

MCLCC-N: Multi-Corps Land Component Command – North

MUSV: medium uncrewed surface vessel

NATO: North Atlantic Treaty Organization

NORAD: North American Aerospace Defense Command

OBBBA: One Big Beautiful Bill Act

RAF: Royal Air Force

ROE: rules of engagement

SLOC: sea line of communication

SSBN: nuclear-powered ballistic missile submarine

SSGN: nuclear-powered guided missile submarine

SSN: nuclear-powered attack submarine

SSP: air-independent propulsion submarine:

sUAV: small uncrewed aerial vehicle

sUSV: small uncrewed surface vehicle

TKMS: ThyssenKrupp Marine Systems

UAV: uncrewed aerial vehicle

USV: uncrewed surface vehicle

UUV: uncrewed underwater vehicle

vsUSV: very small uncrewed surface vehicle

XLUUV: extra-large uncrewed undersea vehicle

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