NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

SUPPLEMENTAL TO DEFENSE ANALYSIS CAPSTONE REPORT

(7 OF 12: APPENDIX G)

USSF CAPABILITY GAP IN THE ARCTIC

by

William B. Martin, Michael K. Tovo,
and Devin L. Kirkwood

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Thesis Advisor:	Kalev I. Sepp
Second Reader:	Michael Locklear (USASOC)

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Report to Congress

Department of Defense Arctic Strategy

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EXECUTIVE SUMMARY

The 2019 Department of Defense (DoD) Arctic Strategy updates the previous 2016 DoD Arctic Strategy as requested by Section 1071 of the John S. McCain National Defense Authorization Act for fiscal year (FY) 2019. This update includes a classified annex.

Specifically, the 2019 DoD Arctic Strategy updates DoD's strategic objectives for the Arctic region, in light of DoD's renewed assessment of the evolving Arctic security environment and the release of the 2018 National Defense Strategy (NDS). Anchored in NDS goals and priorities, this updated Arctic strategy outlines DoD's strategic approach for protecting U.S. national security interests in the Arctic in an era of strategic competition.

DoD's desired end-state for the Arctic is a secure and stable region in which U.S. national security interests are safeguarded, the U.S. homeland is defended, and nations work cooperatively to address shared challenges. Protecting U.S. national security interests in the Arctic will require the Joint Force to sustain its competitive military advantages in the Indo-Pacific and Europe, identified in the NDS as key regions of strategic competition, and to maintain a credible deterrent for the Arctic region.

DoD must be able to quickly identify threats in the Arctic, respond promptly and effectively to those threats, and shape the security environment to mitigate the prospect of those threats in the future. The 2019 DoD Arctic strategy outlines three strategic ways in support of the desired Arctic end-state:

- Building Arctic awareness;
- Enhancing Arctic operations; and,
- Strengthening the rules-based order in the Arctic.

2019 DoD Arctic Strategy

Introduction

This document articulates the Department of Defense's (DoD) strategy for the Arctic region in an era of strategic competition.[1] It is informed by the 2017 National Security Strategy and anchored in the priorities of the 2018 National Defense Strategy (NDS) and its focus on competition with China and Russia as the principal challenge to long-term U.S. security and prosperity. This strategy supersedes the 2016 DoD Arctic strategy.

DoD's desired end-state for the Arctic is a secure and stable region where U.S. national interests are safeguarded, the U.S. homeland is defended, and nations work cooperatively to address shared challenges. This strategy sets forth DoD's assessment of the Arctic security environment, risks posed to U.S. national security interests, DoD Arctic objectives, and the strategic approach by which DoD will achieve these objectives.

A secure and stable Arctic region benefits the United States and necessitates a rules-based order, reflecting Arctic nations' respect for national sovereignty and constructive engagement to address shared challenges. The network of U.S. allies and partners with shared national interests in this rules-based order is the United States' greatest strategic advantage in the Arctic region, and thus the cornerstone of DoD's Arctic strategy. DoD cooperation with Arctic allies and partners strengthens our shared approach to regional security and helps deter strategic competitors from seeking to unilaterally change the existing rules-based order.

NDS goals and priorities guide DoD's strategic approach to the Arctic. The Joint Force must be able to deter, and if necessary, defeat great power aggression. DoD must prioritize efforts to address the central problem the NDS identifies – i.e., the Joint Force's eroding competitive edge against China and Russia, and the NDS imperative to ensure favorable regional balances of power in the Indo-Pacific and Europe. Developing a more lethal, resilient, agile, and ready Joint Force will ensure that our military sustains its competitive advantages, not only for these key regions of strategic competition, but globally as well. Maintaining a credible deterrent for the Arctic region requires DoD to understand and shape the Arctic's geo-strategic landscape for future operations and to respond effectively to contingencies in the Arctic region, both independently and in cooperation with others. DoD's strategic approach seeks to do so by implementing three ways in support of the desired Arctic end-state (each described in detail in this document):

- Building Arctic awareness;
- Enhancing Arctic operations; and
- Strengthening the rules-based order in the Arctic.

[1] This DoD Arctic Strategy uses the definition of the Arctic codified at 15 U.S.C. § 4111. The Arctic means all U.S. and foreign territory north of the Arctic Circle and all U.S. territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort,

Bering, and Chukchi Seas; and the Aleutian islands chain.

Assessment of Arctic Security Environment

The United States is an Arctic nation. The Arctic security environment has direct implications for U.S. national security interests. Geographically, the Arctic comprises the northern approaches of the United States and represents a potential vector both for attacks on the homeland and for U.S. power projection. Approaches to the Arctic Ocean to both the east and west of the United States form strategic corridors for maritime traffic. Arctic sea routes transit through the Bering Strait between the United States and Russia, while the Greenland, Iceland, United Kingdom – Norwegian (GIUK-N) gap is a strategic corridor for naval operations between the Arctic and the North Atlantic.

The Arctic region is comprised of the eight nations with sovereign territory in the Arctic,[2] including multiple U.S. allies and partners. The United States does not recognize any other claims to Arctic status by any State other than these eight nations. The United States maintains strong defense relationships with six of the seven other Arctic nations. Four are NATO Allies: Canada, the Kingdom of Denmark (including Greenland), Iceland, and Norway; and two are NATO Enhanced Opportunities Partners: Finland and Sweden. They are highly capable, with immense experience in high latitude operational environments.

The Arctic security environment is complex. Many positive, cooperative trends endure in the region. At the same time, the region is increasingly uncertain, with a deepening and intensifying of certain problematic strategic trends. Although the immediate prospect of conflict in the Arctic is low, these trends could adversely affect U.S. national security interests, promote instability, and ultimately degrade security in the region. Key dynamics include:

<u>Changing Physical Environment:</u> The Arctic's physical environment continues to change, including through diminished sea ice coverage, declining snow cover, and melting ice sheets.[3] Temperatures across the Arctic region are increasing more than twice as fast as global average temperatures, accompanied by thawing permafrost and loss of sea ice and glacier mass.[4] Diminishing Arctic sea ice is opening new shipping lanes and increasing access to natural resources during the summer months. If the warming trends continue at the current rate, Arctic-wide sea ice loss may result in nearly ice-free late summers by the 2040s.[5] Thawing permafrost, compounded by storm surge and coastal erosion, adversely affects infrastructure, including DoD installations, and complicates the development of new and resilient DoD infrastructure. The physical effects of the changing Arctic frontier are also causing some local communities to adapt

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[2] Arctic nations refers to those countries that are members of the Arctic Council: Canada, the Kingdom of Denmark (including Greenland), Finland, Iceland, Norway, Russia, Sweden and the United States.

[3] NOAA. Osborne E., J. Richter-Menge, and M. Jeffries, Executive Summary [in NOAA Arctic Report Card 2018], p.2-3.

[4] USGCRP. Hayhoe, K., D.J. Wuebbles, D.R. Easterling, D.W. Fahey, S. Doherty, J. Kossin, W. Sweet, R. Vose and M. Wehner, 2018: Our Changing Climate. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Steward (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, p.74.

[5] USGCRP. Taylor, P.C., W. Maslowksi, J. Perlwitz, and D.J. Wuebbles, 2017: Arctic changes and their effects on Alaska and the rest of the United States. In Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J, D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, p. 303.

by relocating. Even so, the Arctic continues to be characterized by harsh conditions, including extremes of cold and darkness, which impose specific requirements for operating and sustaining Joint Force capabilities in the region.

Multilateral Cooperation to Address Shared Interests and Challenges: Arctic nations have historically sought to isolate the region from wider geopolitical conflicts. They continue to demonstrate a strong commitment to multilateral cooperation. Arctic nations have, to date, largely respected each other's sovereign interests in the region, even where these interests diverge. International agreements on scientific research, maritime traffic, and environmental issues represent concrete measures to address the challenges associated with human and economic activity in this harsh Arctic environment. In this context, there has to date generally been a shared interest in a peaceful and stable region that allows the Arctic nations to realize the potential benefits of greater access to the region's resources.

Status of Arctic Sea Routes: Russia and Canada claim the right to regulate Arctic waters in excess of the authority permitted under international law. Russia requires foreign vessels to obtain permission, embark Russian ice pilots, and serve under escort of Russian icebreakers before entering the Northern Sea Route (NSR). Russia has also reportedly threatened to use force against vessels that fail to abide by Russian regulations. Canada considers the waters of the Northwest Passage to be internal waters, subject to the complete sovereignty of Canada.

Increasing Military Activity: Russia views itself as a polar great power and is the largest Arctic nation by landmass, population, and military presence above the Arctic Circle. Russia's commercial investments in the Arctic region have been matched by continued defense investments and activities that strengthen both its territorial defense and its ability to control the NSR. Russia formed the Northern Fleet Joint Strategic Command in December 2014 to coordinate its renewed emphasis on the Arctic. Since then, Russia has gradually strengthened its presence by creating new Arctic units, refurbishing old airfields and infrastructure in the Arctic, and establishing new military bases along its Arctic coastline. There is also a concerted effort to establish a network of air defense and coastal missile systems, early warning radars, rescue centers, and a variety of sensors. China's operational presence in the Arctic is more limited. It includes China's icebreaking vessels, the *Xuelong* and newly-constructed *Xuelong 2,* and civilian research efforts, which could support a strengthened, future Chinese military presence in the Arctic Ocean, potentially including deployment of submarines to the region.[6]

Attempts to Alter Arctic Governance through Economic Leverage: Despite having no territorial claims in the region, China is seeking a role in Arctic governance. As part of China's "One Belt, One Road" initiative, it has linked its economic activities in the Arctic to its broader strategic objectives, as articulated in its first Arctic policy white paper in January 2018. China's stated interests in the Arctic are primarily focused on access to natural resources and the opportunities offered by the Arctic sea routes for Chinese shipping. China does not currently have a permanent Arctic military presence, but is increasing its presence through economic outreach,

[6] DoD Report to Congress: Military and Security Developments Involving the People's Republic of China 2019, p.114.

investments in Arctic states' strategic sectors, and scientific activities. China maintains research stations in Iceland and Norway and has pursued energy development and infrastructure projects in Russia, such as the Yamal liquefied natural gas project. China also continues to seek opportunities to invest in dual-use infrastructure in the Arctic. Despite China's claim of being a "Near Arctic State," the United States does not recognize any such status.

U.S. National Security Interests in the Arctic

The United States has three broad, interlocking sets of national security interests related to the Arctic region. These interests are derived from DoD's assessment of how U.S. national security interests, as defined in the 2017 National Security Strategy,[7] apply to the Arctic region. They include:

1) *The Arctic as the U.S. homeland*: The United States is an Arctic nation with sovereign territory and maritime claims in the region. Its interests include defending U.S. sovereignty and the homeland, including through early warning and missile defense; protecting U.S. critical infrastructure; and achieving domain awareness to protect U.S. security interests in the region.
2) *The Arctic as a shared region*: The Arctic includes a domain of shared interests whose security and stability depend on Arctic nations constructively addressing shared challenges. Regional cooperation – built on a bedrock of internationally recognized principles like national sovereignty – is in the U.S. interest[8] and contributes to a secure and stable Arctic. This is strengthened by the U.S.-led alliance and partnership network in the Arctic and by maintaining activities in the region in line with international norms.
3) *The Arctic as a potential corridor for strategic competition*: The Arctic is a potential avenue for expanded great power competition and aggression spanning between two key regions of ongoing competition identified in the NDS — the Indo-Pacific and Europe — and the U.S. homeland. U.S. interests include maintaining flexibility for global power projection, including by ensuring freedom of navigation and overflight; and limiting the ability of China and Russia to leverage the region as a corridor for competition that advances their strategic objectives through malign or coercive behavior.

Protecting U.S. national security interests in the Arctic requires a holistic approach that recognizes the relationship between these three sets of interests. As DoD examines both the United States' and other nations' interests and activities in the Arctic, DoD will prioritize risks and opportunities at the intersection of these three sets of interests. Additionally, DoD activities to protect U.S. national security interests in the Arctic will be in support of broader whole-of-government efforts.

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[7] The 2017 National Security Strategy identifies U.S. interests as follows: protecting the American people, the homeland, and American way of life; promoting American prosperity; preserving peace through strength; and advancing American influence.

[8] The National Security Strategy refers to the Arctic and affirms that "It is vital to U.S. prosperity and security that these [international] institutions uphold the rules that help keep these common domains open and free".

Risks to U.S. National Security Interests

Trends in the Arctic security environment present specific risks across the three sets of U.S. national security interests:

Homeland: The Arctic is strategic terrain as a potential vector for an attack on the U.S. homeland. China and Russia pose discrete and different challenges in their respective theaters, but both are also pursuing activities and capabilities in the Arctic that may present risks to the homeland. In addition to the challenge posed by strategic competitors, coastal erosion and permafrost thaw pose risks to DoD Arctic installations. Increased economic activity in the Arctic raises the probability of a mass casualty incident in the Arctic where DoD assistance may be requested. Natural disasters or other contingencies, such as an oil spill, may severely affect Alaska, requiring DoD support to civil authorities. These events may also inhibit DoD's ability to project power from the homeland.

Shared Region: In different ways, Russia and China are challenging the rules-based order in the Arctic. Russia regulates maritime operations in the NSR, contrary to international law, and has reportedly threatened to use force against vessels that fail to abide by Russian regulations. Russia has generally followed international law and procedure in establishing the limits of its extended continental shelf. Russia could choose to unilaterally establish those limits if the procedures prove unfavorable and could utilize its military capabilities in an effort to deny access to disputed Arctic waters or resources. China is attempting to gain a role in the Arctic in ways that may undermine international rules and norms, and there is a risk that its predatory economic behavior globally may be repeated in the Arctic.

Potential Corridor for Strategic Competition: Developments in the Arctic have the potential to directly or indirectly constrain DoD's ability to flow forces globally, and more broadly to affect U.S. strategic objectives related to competition with China and Russia in the Indo-Pacific and Europe. The Arctic remains vulnerable to "strategic spillover" from tensions, competition, or conflict arising in these other regions.

DoD Arctic Objectives

The 2018 NDS provides the overarching strategic guidance for framing DoD's Arctic Strategy. The NDS establishes DoD's goals and priorities for defending the homeland and protecting U.S. and allied interests globally by regaining the Joint Force's competitive military edge against China and Russia. Anchored in this strategic aim and supporting NDS tenets, and informed by DoD's assessment of risks to U.S. national security interests, this strategy sets forth the following prioritized DoD objectives for the Arctic region:

1. ***Defend the homeland*:** The NDS affirms defense of the homeland as the first priority for DoD. The Department must be prepared to defend U.S. sovereignty in the Arctic. The Arctic is also strategic terrain because it constitutes the northern approaches to the United States; DoD must defend the homeland against threats emanating from these approaches.

2. ***Compete when necessary to maintain favorable regional balances of power*:** The Arctic is a potential corridor – between the Indo-Pacific and Europe, and the U.S. homeland – for expanded strategic competitions. Strategic competitors may undertake malign or coercive

activities in the Arctic in order to advance their goals for these regions. DoD must be prepared to protect U.S. national security interests by taking appropriate actions in the Arctic as part of maintaining favorable balances of power in the Indo-Pacific and Europe.

3. ***Ensure common domains remain free and open:*** The Arctic is a shared region comprising the territories of the eight circumpolar nations and including the Arctic Ocean. DoD, in partnership with other Federal departments and agencies and our Arctic allies and partners, should ensure continued access to the Arctic for legitimate civilian, commercial, and military purposes.

These Arctic objectives are not mutually exclusive; they are interdependent and will need to be achieved in concert with one another. Close collaboration across and between DoD components in support of these strategic objectives will ensure consistent implementation of this strategy. Additionally, this prioritization of objectives should not be interpreted to mean that all DoD activities, presence, and investments related to a particular objective are a higher priority than those related to another objective. Rather, this framing offers a broad, relative scheme of prioritization based on risks to U.S. national security interests, relevance to and consequences for NDS priorities, and the mandate of established DoD roles and missions.

DoD's Strategic Approach for the Arctic

DoD's strategic approach for the Arctic is to protect U.S. national security interests and prudently address risks to those interests in ways that uphold the region's rules-based order, without fueling strategic competition. Competitive behavior in the Arctic must not distract from or undermine broader NDS priorities; the Department must remain vigilant to how developments in the Arctic affects these priorities. A stable and conflict-free Arctic benefits the United States by providing favorable conditions for resource development and economic activity, as well as by contributing to upholding the international order and regional cooperation on challenges that affect all Arctic nations. DoD will seek to shape military activity in the Arctic region to avoid conflict, while ensuring that the Joint Force is postured and prepared to deter strategic competitors from threatening our interests.

U.S. Allied and Partner Network: Cooperation with allies and partners is the cornerstone of this strategic approach. U.S. allies and partners share a deep, mutual interest in the existing rules-based order. Our network of allied relationships and capabilities is the United States' greatest strategic advantage in the Arctic region. Our defense ties extend and amplify the credibility of our collective deterrent against shared challenges; enhance our ability to contend with strategic competition; and form the basis for a mutual approach to maintaining a secure and stable Arctic region. DoD will pursue a collaborative approach with allies and partners, including both Arctic nations and like-minded non-Arctic nations, in working across the ways and means identified in this strategy.

Deterrence in the Arctic: To ensure a credible deterrent for the Arctic, DoD must be able to quickly identify threats in the region, respond promptly and effectively to these threats, and shape the security environment to reduce or mitigate the prospects of these threats manifesting in the future. The United States must be able to deter strategic competitors from aggression in the

Arctic by ensuring the Joint Force has the proficiency to respond to regional contingencies, both independently and in cooperation with allies and partners. The U.S. Arctic deterrent will require agile, capable, and expeditionary forces with the ability to flexibly project power into and operate within the region, as the Joint Force must be able to do elsewhere globally. As DoD examines the attributes of Joint Force capabilities, posture, operations, and activities necessary for deterrence in the Arctic, it will do so in a strategy-driven and resource-informed way. Determinations will be made on the basis of U.S. interests, NDS goals and priorities, DoD's Arctic objectives, and emerging threats in the Arctic and other key theaters of competition, rather than by a parity-based approach that seeks to approximate competitors' capabilities and numbers of units, systems, or bases.

Support to other U.S. Department, Agency, and Community Roles: Other Federal departments and agencies play critical roles in protecting U.S. national security interests in the Arctic; DoD will work closely with other Federal departments and agencies in support of their efforts. These departments and agencies have lead responsibilities for key aspects of the Arctic security environment, including from a diplomatic and homeland security perspective. DoD will work with other Federal departments and agencies by identifying and communicating the effects of strategic competitors' activities, engagements, and interests in the region, and supporting wider U.S. Government engagement within Arctic multilateral forums. DoD will continue to coordinate and collaborate with interagency partners on research and development activities to build Arctic capabilities through the Interagency Arctic Research and Policy Committee. DoD will also seek to provide support as appropriate to wider U.S. Government responses to contingencies in the Arctic, such as natural disasters.

DoD will also continue to recognize the importance of working with Alaska Natives in the Arctic. DoD engages closely with local communities in Alaska and recognizes their equities as part of DoD activities in the region. DoD has instituted specific programs to ensure regular communication with Alaska Natives and to incorporate their views on regional developments into DoD activities.

Arctic Ways & Means

Implementing the strategic approach described above to advance DoD's Arctic objectives requires three sets of strategy-informed ways:

- Building Arctic awareness;
- Enhancing Arctic operations; and
- Strengthening the rules-based order in the Arctic.

These strategic ways will inform DoD's presence, capability, and resourcing priorities in the Arctic. They encompass both activities DoD is undertaking and capability gaps DoD is addressing in order to achieve the desired strategic effects in the Arctic. DoD decisions on resourcing in these areas will be made as part of the Department's Planning Programming, Budgeting, and Execution process.

Commander U.S. Northern Command (CDRUSNORTHCOM) is designated as DoD's Arctic Capability Advocate. This designation recognizes the unique challenges posed by the Arctic environment, as well as the Arctic geography which spans across multiple Combatant Command's Areas of Responsibility. Arctic capabilities advocacy comes in many forms. In the role of DoD Arctic Capability Advocate, CDRUSNORTHCOM will coordinate with other Combatant Commands, the Military Departments, and Defense Agencies to ensure that Arctic capability gaps are identified and prioritized, and that appropriate means of advocacy are emplaced to effectively communicate associated risks.

Building Arctic Awareness

DoD's ability to detect threats in the Arctic is a prerequisite to deterring or responding to strategic competitors' activities in the region. In order to operate effectively in the Arctic, DoD must also maintain the ability to understand its operational environment.

The Arctic environment presents specific operational challenges that limit communications, including the harsh climate, vast distances, and atmospheric phenomena. Even within the Arctic there is considerable variation between the North American Arctic, which has a harsher climate, and the milder, Gulf Stream-affected, European Arctic. The North American Arctic also lacks the relatively robust logistics infrastructure of the European Arctic. Operating effectively in the Arctic, therefore, requires DoD to make time-sensitive, risk-informed investments to understand and build awareness of the region.

Enabling domain awareness. Effective surveillance of the northern air and maritime approaches to North America is foundational to homeland defense aerospace warning, aerospace control, maritime warning, and missile defense. Cooperation with Canada through the North American Aerospace Defense Command (NORAD) is key to the defense of the northern approaches. To detect and track potential airborne threats, including Russian long-range bombers and cruise missiles, the United States and Canada rely on radar systems such as the aging North Warning System, a network of aerospace surveillance radars in northern Canada and Alaska. DoD's ability to detect threats and defend North America is challenged by rapidly advancing strategic competitors' capabilities. Modernizing DoD's missile and cruise missile defense systems is critical to maintaining a layered approach to domain awareness through multi-domain sensors that include terrestrial radars and space-based capabilities. DoD's current binational study with Canada's Department of National Defence is evaluating potential solutions for modernization of sensor coverage of North America to deter, detect, track, and enable defeat of both existing and emergent airborne threats to North America, including the threats posed by Russia's advanced cruise missile and hypersonic glide vehicle capabilities. Among potential Arctic defense investments, DoD will prioritize modernization of infrastructure supporting enhanced domain awareness.

Additionally, DoD is enhancing maritime surveillance of the GIUK gap and the North Atlantic through cooperation with the United Kingdom and Norway on P-8 aircraft patrols. This complements existing NATO air policing missions hosted by Iceland.

Improving communications & Intelligence, Surveillance and Reconnaissance (ISR). Command, Control, Communications, Computers, and ISR (C4ISR) are essential to operations in the Arctic, but remains challenging above 65 degrees North latitude. Communications challenges exist as atmospheric interference in the form of solar and magnetic phenomena degrades high-frequency radio signals. Satellite-based communications are also limited, further constraining reliable voice communication and restricting data coverage in the Arctic region.

Given this operating environment, there is a need for deployable communications and data networks capable of operating in the northern latitudes. This requires establishing robust and dynamic communications architecture with terrestrial, aerial, and space layers that are fully integrated and interoperable with mission partners. Both terrestrial and aerial communications equipment must be designed to function in the harsh Arctic weather conditions, which include rapid cycles of freezing and thawing and temperatures below minus 60 degrees Fahrenheit. Equipment testing must also be conducted in realistic Arctic conditions for sufficient periods of time. Adequate data coverage requires sufficiently ruggedized sensors to be deployed year-round for longitudinal data-set acquisition.

Increasing in-situ observations and enhancing environmental modeling. Understanding and predicting the physical environment is critical for meeting mission demands and for ensuring the safety of personnel and equipment. The Arctic operational environment is made more challenging by several factors, including sea ice, ocean currents, wind, water and air temperature, sea spray and icing conditions, highly variable ionospheric densities, and daylight durations. DoD continues to invest in improved predictive capabilities for the Arctic regions that will enable more reliable forecasts. DoD is exploring solutions as the Defense Meteorological Satellite Program, a key tool in sensing and weather data collection in support of U.S. military operations, reaches its end-of-life.

Increasing *in-situ* meteorological, oceanographic, and atmospheric observation data is key. DoD will continue to collaborate with other Federal departments and agencies to advance predictive capability. This involves partnerships with other Federal entities, including the U.S. National Ice Center, to support efforts such as the U.S. Interagency Arctic Buoy Program to increase observations, and the National Earth System Prediction Capability program, to develop fully coupled ocean and atmospheric models that incorporate oceanographic and atmospheric parameters, including sea waves and sea ice.

Supporting the Coast Guard's Homeland Security Missions. The Coast Guard is the lead agency for homeland security in the Arctic. It has specific responsibilities for establishing and maintaining situational awareness across the region. The Coast Guard's investments in ice-breaking ships through the Polar Security Cutter program support Arctic operations for a range of mission sets, including homeland security, defense, and search and rescue.[9] DoD will continue to support this program, as it provides a key capability to ensure interoperability between Coast Guard and Navy vessels and to support U.S. presence in the Arctic region.

[9] The Coast Guard is recapitalizing its polar icebreaker fleet through the Polar Security Cutter Program to address the need for six new polar security cutters.

Continued engagement through the National Fleet Board will support close dialogue and cooperation between DoD and the Coast Guard on maritime domain awareness, intelligence, and strategic planning.

Enhancing Arctic Operations

DoD's ability to provide a combat-credible deterrent for the Arctic region requires enhancements in the Joint Force's flexibility to respond promptly and effectively to contingencies in the region. DoD's emphasis will be on adapting existing capabilities and, where necessary, selectively acquiring new capabilities, combined with Arctic-tailored training, exercises, and posture refinements.

Regular exercises and deployments in the Arctic. DoD will demonstrate and enhance the Joint Force's ability to operate in the Arctic through regular exercises and deployments in the region, both independently and with allies and partners. Some exercises will be conducted within the NATO context; others will be bilateral or multilateral. Exercises with Arctic allies and partners enable our ability to deter aggression from strategic competitors, including anti-submarine warfare and cold weather and mountainous training. DoD is also an active participant in exercises hosted by other nations, including TRIDENT JUNCTURE, ARCTIC CHALLENGE, and COLD RESPONSE Exercises.

Exercises such as ARCTIC EDGE and BOLD QUEST will enhance the Joint Force's familiarity with, and proficiency operating in, Arctic conditions and will improve joint, as well as Service, operations in the region. The Joint Pacific Alaska Range Complex enables training and exercising opportunities in Arctic conditions and across domains.

Recognizing that the Arctic region, and our strategic competitors' activities, extend beyond the responsibility of any single Combatant Command, exercises naturally drive increased cooperation between geographic Combatant Commands across Areas Of Responsibility, as well as between geographic and functional Combatant Commands. The Joint Staff-led Globally Integrated Exercise construct supports enhanced coordination of Arctic-related exercises and exercise objectives.

Cold Weather Training. Operating in extreme cold weather conditions (exceeding minus 60 degrees Fahrenheit) requires specific tactics, techniques, and procedures. Toward this purpose, DoD will build on existing cold weather training for other operating environments. The Northern Warfare Training Center (NWTC) at Fort Wainwright, Alaska provides cold weather and mountain training, while Eielson Air Force Base, Alaska hosts the Arctic Survival Training School which is the Air Force's oldest survival school. DoD will continue to assess cold weather training needs to prepare its forces for Arctic operations, particularly for joint operations. Additionally, DoD will work to ensure that forces deployed within Arctic areas of operation employ ground mobility assets capable of sustained operations in extreme cold weather, across all forms of terrain that may be encountered on a year-round basis, including Arctic ice.

Cold weather training is also conducted in cooperation with Arctic allies and partners. The rotations of U.S. Marines through the North Atlantic region include combined training involving mountainous assault exercises and cold weather survival.

Refining Arctic posture. The Arctic offers an alternative vector for U.S. power projection and maneuver as part of DoD operations in other regions. DoD will maintain access to the Arctic to support the global mobility and projection of U.S. military forces. The forward deployment and pre-positioning of U.S. equipment and supplies in Arctic allied and partner nations supports the Joint Force's ability to quickly respond to contingencies in the region. The Department will assess the needs, costs/risks, and benefits of targeted investments to modestly enhance existing, regional infrastructure, both in Alaska and in Europe, to enable operational flexibility to project forces into the region on an expeditionary basis. In this continued assessment of potential infrastructure development needs in the Arctic, DoD will take into account the long lead times and logistical challenges arising from the extreme weather and environmental conditions. DoD investments in infrastructure will complement Arctic allied and partner investments, as they host U.S. and other like-minded nations' forces.

Supporting resilient infrastructure. Critical infrastructure supports the Joint Force's ability to flow forces from the homeland and project power globally. DoD will seek to enhance the resilience of critical infrastructure in the Arctic region by coordinating with other Federal departments and agencies and the private sector to protect against asymmetric attacks. The Department will also continue to take steps to build the resilience of infrastructure in the face of environmental hazards, including through research on permafrost effects to infrastructure. Predicting where permafrost thaw will occur is vital to maintaining Arctic training operations and assessing impending environmental management challenges. Continued DoD research, development, testing and evaluation will support efforts to build the resilience of Arctic infrastructure in the face of environmental hazards.

Working with other Federal Departments and Agencies on Civil Contingency Responses. The demand for Defense Support of Civil Authorities (DSCA) activities is likely to grow with increased economic activity and enduring geological and environmental risks in the Arctic, including demand for responses to possible mass casualty incidents and natural disasters. DoD is responsible for the coordination of aeronautical search and rescue for the Elmendorf search and rescue region and works closely in support of the Coast Guard, the lead Federal agency for maritime search and rescue. DoD does not shape or size the Joint Force for DSCA activities, but will enhance cooperation with relevant State and Federal departments and agencies in order to improve DoD's effective, coordinated responses to such contingencies.

Strengthening the Rules-Based Order in the Arctic

DoD will continue to work with allies and partners to strengthen the existing, international rules-based order in the Arctic. Sustaining and strengthening the rules-based order will help to both deter strategic competitors from specific, aggressive acts and from unilaterally seeking to change norms governing access to the region. Toward this aim, DoD will cooperate

with allies and partners to strengthen regional security and will support enhanced U.S. Government participation and cooperation in Arctic forums.

Cooperating with allies and partners to deter aggression. DoD will work with Arctic allies and partners to improve our collective deterrent and ability to respond to contingencies in the Arctic. This will include continued efforts to enhance our shared situational awareness of the Arctic security environment through strategic dialogues and information sharing, as well as further developing a common understanding of our activities in, and approaches to, the region. The DoD will strengthen this cooperation through senior leader visits and bilateral meetings, regular defense engagement forums such as the U.S. European Command-led military-to-military Staff Talks and Policy-led Bilateral Study Groups and Strategic Dialogues, and implementation of bilateral roadmaps and statements of intent. Frequent U.S. participation in Nordic Defense Cooperation-led and Northern Group-led forums, in addition to the Arctic Security Forces Roundtable, will help build a shared approach to challenges in the Arctic. Beyond diplomatic forums, Arctic allies and partners are highly capable, with experience and proficiency in Arctic conditions that will benefit the Joint Force. DoD will also seek to enhance cooperation through combined training and exercises, both in the United States and elsewhere in the region.

DoD's cooperation within NATO uniquely contributes to Arctic security and deters strategic competitors from using the Arctic as a corridor for expanded competition enabling their objectives in other regions. The principle of collective defense enshrined in Article 5 of the Washington Treaty applies to NATO members located in the Arctic, and thus helps deter aggression. Arctic allies and partners are active participants in NATO activities; NATO exercises in the High North, such as Exercise TRIDENT JUNCTURE, offer opportunities to improve interoperability in harsh climactic conditions. The establishment of Joint Force Command Norfolk in 2018 as an operational-level warfighting headquarters supports the protection of sea lines of communication and allied reinforcement across the North Atlantic. These initiatives strengthen the United States' and allies' collective defense and address potential maritime challenges arising from the projection of power from the Arctic through the GIUK-N gap.

Preserving Freedom of the Seas. Maintaining freedoms of navigation and overflight are critical to ensuring that the Arctic remains a free and open domain and that U.S. forces retain the global mobility guaranteed under international law. DoD will continue to fly, sail, and operate wherever international law allows. When necessary and appropriate, the United States will challenge excessive maritime claims in the Arctic to preserve the rules-based international order and the rights and freedoms of the international community in navigation and overflight, as well as for other, related high seas uses.

Conclusion

Within the context of NDS implementation more broadly, DoD will continue to prepare and posture the Joint Force to ensure that the Arctic is a secure and stable region where U.S. national interests are safeguarded, the U.S. homeland is defended, and nations work cooperatively to address shared challenges. This strategy outlines a Departmental approach and supporting measures to ensure that the Joint Force presents a credible deterrent for the Arctic

region, while also prioritizing a continued, cooperative approach to maintaining the existing rules-based order in the Arctic.

Annex A: Service Roles and Missions in the Arctic

Each Military Department plays a critical role in achieving objectives and approach outlined in this Arctic strategy.

Air Force

The Air Force operates the majority of DoD's assets in the Arctic. The Air Force's activities support international norms of access and navigation to ensure adequate protection of U.S. national security interests in the region.

Air and space assets are especially crucial for the Arctic region due to its vast distances and minimal land and maritime infrastructure. Air Force mission sets in the Arctic range from missile defense and power projection to space situational awareness and search and rescue. Vital early warning decision space for homeland defense is provided by the Alaska Radar System and more than 50 radars that comprise the North Warning System across Canada. Assets at Clear, Alaska, and Thule, Greenland, are uniquely positioned for supporting space surveillance and satellite control networks, tracking tens of thousands of objects in orbit daily.

The Air Force maintains several large air bases supporting Arctic operations, including those at Elmendorf Air Force Base (AFB) and Eielson AFB in Alaska. Alaska offers key strategic locations for projecting airpower into the Indo-Pacific and Europe. These Alaskan bases support critical advanced generation fighter aircraft, including the F-35, and aerial refueling tankers from a strategic forward location offering global reach. The New York Air National Guard operates unique ski-equipped aircraft that provide access to some of the most remote locations on the Greenland ice sheet. The Alaska Air National Guard's Rescue Coordination Center works closely with the Coast Guard to perform hundreds of search and rescue missions annually.

The Air Force contributes to essential training events focused on Arctic readiness, including operating Air Force's oldest survival school at Eielson AFB, Alaska. Finally, the Air Force executes Exercise RED FLAG Alaska and contributes to the Joint Pacific Alaska Range Complex, DoD's largest airspace, at 65,000 square miles, optimized for high-end training against strategic competitors.

In addition to these key, existing assets and posture, the Air Force continues to explore opportunities to modernize and enhance Arctic capabilities.

Navy

The Arctic region is uniquely relevant to the Navy's ability to provide flexible deterrent options. The Arctic provides additional maneuver room for distributed nuclear and conventional force deterrent operations. The Navy's 2nd Fleet has responsibility for ensuring the readiness of, and dynamically employing, maritime forces in the Atlantic and the Arctic, and the ability to

fight across multiple domains, thereby deterring aggression. Commander, U.S. 2nd Fleet is dual-hatted as Commander of NATO's Joint Force Command Norfolk.

The Navy will be ready to exercise, maintain, and exploit Sea Control in order to defend U.S. maritime access and interests in the Arctic. Naval forces provide maritime security in the maritime domain and the seaborne approaches to the United States, including the Arctic. Maritime security in the Arctic includes defending sea lines of communication and the homeland from seaborne attacks, maritime domain awareness, and supporting Coast Guard operations as required. The Navy builds interoperability with the Coast Guard through the National Fleet Plan and the associated National Fleet Board. Regular meetings of the Coast Guard-Navy National Fleet Board Arctic Working Group address cooperation and maritime security operations in the Arctic. The Navy also ensures access to the Arctic through routine deployments of submarines and aircraft to the region.

The Arctic enables sea-based power projection (e.g., precision fires from ships, submarines, carrier-based aircraft, and Marines Corps operations) from vectors outside of traditional operating areas. The Navy conducts the biennial ICEX submarine exercise north of Alaska's North Slope. This is a multi-national submarine exercise that enhances readiness for sustained Arctic operations.

Through its sealift operations, the Navy provides timely movement, positioning, and sustainment of the Joint Force across the range of military operations, including the movement of personnel, material, and forces to and from or within the Arctic, by sea.

The Navy will provide support as required to Arctic search and rescue missions conducted and led by the Coast Guard, and as directed in support of international partners.

As part of its DSCA and Humanitarian Assistance/Disaster Relief responsibilities, the Navy will remain ready to support Arctic operations, such as: pollution response and natural disaster recovery; integrated planning efforts with local, State, Federal, and native communities; and interoperability with the Coast Guard and international partners.

Marine Corps

The Marine Corps maintains capability to support Naval operations in "any clime and place," including the Arctic. Depending on seaborne lift, the Service plans for a baseline of two Marine Expeditionary Brigades that can conduct offensive operations in extreme cold weather environments.

To develop and maintain this capability, the Marine Corps routinely deploys Marine Air-Ground Task Forces of varying sizes to conduct cold weather training. The units train at the Marine Corps Mountain Warfare Training Center, and other venues, including Camp Ripley, Minnesota and Fort McCoy, Wisconsin. The Service also trains in Alaska, in Exercise ARCTIC EDGE, and in Norway, in exercises such as TRIDENT JUNCTURE, as well as through winter training rotations above the Arctic Circle. These training exercises feature interoperability training with NATO allies such as Norway and the United Kingdom. Additionally, the Marine

Corps conducts cold weather training in the Pacific, including in the Korea Marine Exercise Program, and in northern Japan, in winter exercises such as FOREST LIGHT.

The Marine Corps has recently upgraded its Infantry Combat Clothing and Equipment (ICCE) cold weather inventory. The Service maintains sufficient cold weather ICCE for the entire active and reserve population and Extreme Cold Weather Clothing System (ECCWCS) ICCE (sufficient for temperatures to minus 25 degrees Fahrenheit) for 35,000 Marines. The resulting ability to outfit 39,000 Marines for extreme cold weather supports the Arctic-capable two MEB objective.

Army

On order, U.S. Army Alaska (USARAK) executes Joint Forces Land Component Commander functions in support of United States Army Pacific (USARPAC) operations and USNORTHCOM Homeland Defense and DSCA missions in Alaska. Army forces are postured to support mission sets through the USNORTHCOM-defined Alaska Joint Operations Area, as well as worldwide unified land operations in support of USARPAC.

Army Space and Missile Defense Command/Army Strategic Command mans and operates Ground-Based Interceptors at Fort Greely, Alaska, to defend the U.S. homeland from long-range ballistic missile attacks.

The U.S. Army Corps of Engineers Engineering (USACE) Research and Development Center, Cold Regions Research and Engineering Laboratory (ERDC-CRREL) works to enhance Arctic domain awareness by examining the effects of a changing climate; and by monitoring Arctic effects on the operational environment, including sensor performance and signal propagation. The USACE ERDC-CRREL addresses effects on infrastructure and operations resulting from exposure to extreme environmental and dynamic climactic conditions. USACE ERDC-CRREL is pursuing technology to detect permafrost conditions, providing facilities to simulate Arctic conditions, as well as systems and materials evaluation and development.

The U.S. Army Cold Regions Test Center, located at Fort Greely, Alaska, plans and conducts developmental testing, with an emphasis on Soldier participation, in the snow, extreme cold, and sub-arctic natural environment. This provides acquisition and Army leadership with timely, accurate, and relevant information relating to system performance.

USARAK manages Joint Pacific Alaska Range Complex training areas and airspace in and around Eielson Air Force Base and Fort Greely.

Special Operations Forces

Special Operations Forces (SOF) routinely participate in Arctic or near-Arctic region exercises (e.g., BOLD QUEST, NORTHERN GRIFFIN, TRIDENT JUNCTURE) to ensure interoperability with allies and partners.

The agile and expeditionary nature of SOF, combined with established allied and partner relations and interoperability, provides DoD a ready capability to compete below the level of armed conflict in the Arctic region, and across the spectrum of SOF core activities.

National Guard

The National Guard, through the Army or the Air Force, provides forces that may be made available to support DoD's missions in the Arctic region.

The National Guard operates in both Federal and State capacities in the Arctic, contributing to a spectrum of DoD missions. In a Federal duty status, the National Guard provides ready forces available for mobilization as part of defense of the homeland or abroad, as well as for conducting DSCA missions. Drawing on forces located in Alaska and other regions, the National Guard augments Title 10 DoD forces, including in such missions as ballistic missile defense. The National Guard also contributes to DoD's air mobility in the Arctic and leads the only U.S. LC-130 Wing capable of operating C-130s from ice locations in the Arctic.

In Title 32 and State duty status, the National Guard undertakes Disaster Response, Domain Awareness, Arctic Search and Rescue, Homeland Defense, and Environment Protection missions. The National Guard's performance of these roles in Alaska builds operational proficiency in extreme climactic conditions and helps address some of the challenges posed by the changing physical environment. In addition, in Alaska the National Guard leads the Alaska Native Tribal liaison, supporting engagement with local indigenous communities.

In a State duty status, the National Guard has conducted international engagement with Arctic allies and partners, including planning and coordination activities related to disaster response and civil support. The National Guard Arctic Interests Council focuses and synchronizes interstate Arctic interests and expertise.