The Strategic Context of the Arctic and Implications for the US Army

A Monograph

by

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Effects of Arctic warming are projected to accelerate the rate at which Arctic sea ice melts, allowing the Arctic's natural resources and navigable sea lines of communications to be more accessible. The expected changes to the Arctic environment will impact the strategic interests of national stakeholders, as well as the US Arctic strategic policy. The strategic context of the Arctic is created through the fabric of relations between nations who reside along the boundaries of the Arctic Ocean, those near-Arctic nations with national interests, and the international organizations that provide a forum for discussion. Each actor's geostrategic goals, as published through individual Arctic strategies, contain three common themes: sovereignty, resource development, and maritime shipping. The United States, in comparison with other Arctic nations, has been dilatory in developing an Arctic Strategy and allocating resources. The US Army in particular should look to the other Arctic nations for unique sourcing solutions to combat the effects of an unpredictable environment on operational reach, infrastructure, and command and control.

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Abstract

The Strategic Context of the Arctic and Implications for the US Army, by MAJ Matthew Todd, 53 pages.

Effects of Arctic warming are projected to accelerate the rate at which Arctic sea ice melts, allowing the Arctic's natural resources and navigable sea lines of communications to be more accessible. The expected changes to the Arctic environment will impact the strategic interests of national stakeholders, as well as the US Arctic strategic policy. The strategic context of the Arctic is created through the fabric of relations between nations who reside along the boundaries of the Arctic Ocean, those near-Arctic nations with national interests, and the international organizations that provide a forum for discussion. Each actor's geostrategic goals, as published through individual Arctic strategies, contain three common themes: sovereignty, resource development, and maritime shipping. The United States, in comparison with other Arctic nations, has been dilatory in developing an Arctic Strategy and allocating resources. The US Army in particular should look to the other Arctic nations for unique sourcing solutions to combat the effects of an unpredictable environment on operational reach, infrastructure, and command and control.

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Acronyms

ALCOM	Alaska Command
ARCG	Arctic Response Company Group
EEZ	Economic Exclusion Zone
ICBM	Inter Continental Ballistic Missile
IMO	International Maritime Organization
IPCC	International Panel on Climate Change
DHS	Department of Homeland Security
DoD	Department of Defense
DoS	Department of State
NATO	North Atlantic Treaty Organization
NORAD	North American Aerospace Defense Command
NSAR	National Strategy for The Arctic Region
NSR	Northern Supply Route
NWP	North West Passage
NWTC	Northern Warfare Training Center
SLOC	Sea Lines of Communication
UCP	Unified Command Plan
UN	United Nations
UNCLOS	United Nations Convention of the Law of the Sea
USARAK	Unites States Army Alaska
USEUCOM	United States European Command
USCG	United States Coast Guard
USSR	Union of Soviet Socialist Republics
USNORTHCOM	United States Northern Command

Illustrations

Introduction

> After nine months of snow, ice, cold, and relative darkness, there are a few brief weeks of thaw when much of the Arctic ground is awash with water and boggy… …This marked seasonal contrast provides two dramatically different environments, which are a challenge and constraint to traditional and modern human systems
>
> —D. Sugden, *Arctic and Antarctic: A Modern Geographical Synthesis*

In the coming years, the Arctic will continue to heat up both literally and figuratively. Environmental changes are creating conditions in the Arctic that the United States and its allies must address. Scholarly works on the challenges presented by a changing Arctic environment have emerged with the same rate as the disappearing sea ice. Unfortunately, few studies have addressed the importance of land operations and how the changes in the Arctic environment will influence the capabilities of the US Army. Changing environmental conditions will have significant impacts on the US Army's ability to conduct operations in a difficult environment of national interest.

Framing the Arctic operational environment through the identification of environmental changes throughout the region is important in understanding the scale of geostrategic changes. The Arctic Polar Region can be described as a frozen ocean surrounded by land, including an assortment of diverse landscapes. Historical conditions indicate that temperatures, on average, are close to freezing during the summer months and well below freezing during winter. As environmental changes accelerate, the Arctic can expect rising temperatures to generate substantial reduction of sea ice, loss of permafrost, and an increase in standing water. Records show that 2017 had the shortest winter in terms of snow cover duration. The year also set a record low for Arctic sea ice extent with 25% less ice than the 1981-2010 average.[1] Changing environmental conditions are altering the economic calculus of resource extraction by making the

[1] J. Richter-Menge et al., *2017: Arctic Report Card 2017* (Washington, DC: National Oceanic and Atmospheric Administration, 2017), 3, accessed December 14, 2017, http://www.arctic.noaa.gov/Report-Card.

mining of natural resources more viable.[2] This loss of sea ice will dramatically change the strategic impact of the Arctic for the surrounding nations. It will increase human presence through more accessible natural resources, and it will offer shortened trade routes between Asia and Europe through the Northwest Passage (NWP) or Northern Sea Route (NSR).[3] Changes in the density of permafrost will have impacts on the boreal forest, suitability of ground transportation, and standing groundwater. Arctic nations recognize these pending changes and have created international institutions such as the Arctic Council to provide an avenue for dialogue and change.[4] Each Arctic nation is addressing the environmental changes differently based on their own strategic interests. This monograph seeks to identify those strategic policies and the military response to fulfill national strategic directives.

Environmental changes will create opportunities and influence the geostrategic significance of the Arctic for both Arctic and near-Arctic nations. The five littoral Arctic nations of the United States, Canada, Russia, Norway, and Denmark have claimed physical portions of the Arctic and their interactions with each other are reminiscent of historian Charles Tilley's work on the formation of European states, which valued continued expansion fixed to the physical territory.[5] Near-Arctic nations, such as China, are also beginning to demonstrate an appreciation of the Arctic with its recent white paper on Arctic strategy.[6] In this regard, many of the Arctic nations take an international relations realist approach to their view of the Arctic's importance in

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[2] James R. Lee, *Climate Change and Armed Conflict: Hot and Cold Wars* (New York: Routledge, 2009), 16.

[3] Intergovernmental Panel on Climate Change et al., ed., *Summary for Policymakers: The Regional Impacts of Climate Change: An Assessment of Vulnerability* (Geneva, Switzerland: IPCC, 1997).

[4] Robert Huebert, "U.S. Arctic Policy: The Reluctant Arctic Power," in *The Fast-Changing Arctic, Rethinking Arctic Security for a Warmer World*, ed. Barry Scott Zellen (Calgary: University of Calgary Press, 2013), 189–226.

[5] Charles Tilly, *Coercion, Capital, and European States, AD 990-1992* (Cambridge, MA: Blackwell, 1992), 36.

[6] "China's Arctic Policy," accessed February 13, 2018, http://english.gov.cn/archive/white_paper/2018/01/26/content_281476026660336.htm; Scott G. Borgerson, "Arctic Meltdown: The Economic and Security Implications of Global Warming," *Council on Foreign affairs* 87, no. 2 (April 2008): 63–77.

national security, resource protection, and maritime shipping. Within this strategic context, the United States and Canada view the Arctic as critical to their intercontinental missile defense of North America, Norway has relocated its military headquarters north of the Arctic Circle, and Russia has developed a new Arctic joint strategic command headquartered in Severomorsk in the Kola Peninsula on the Arctic Ocean.

Another view shared by Arctic and near-Arctic nations is a liberalist approach, which defines the Arctic as a global commons. Nations such as China, Japan, and Germany utilize the Arctic for transnational shipping and resource development. Following the liberalist approach, international organizations such as the Arctic Council have been created to provide a forum in which the Arctic and near-Arctic nations can discuss policy. Agreements on disaster response, search and rescue, and commercial fishing set legally binding resolutions among the stakeholders. Each stakeholder has developed national strategies governing political objectives and military goals within the Arctic. The United States, in particular, has published a number of strategies from the national level to the service component.[7]

Under President Barack Obama, the United States published a 2013 *National Strategy for the Arctic Region*, with the Department of Defense (DoD) publishing a nested Arctic strategy in the same year, which was revised in 2016. Those documents, combined with emerging threat capabilities of North Korea and increased Russian aggression, create an American narrative of the Arctic focused on the protection of national resources and safeguarding of national security interests within Alaska and the attached continental shelf. The DoD, the Department of the Navy, and US Coast Guard have all published glide paths and held several academic forums addressing the geostrategic importance of the Arctic. The US Army, which owns the preponderance of forces

[7] US Department of Defense, *Arctic Strategy* (Washington, DC: Government Printing Office, 2016); Barack Obama, *National Security for the Arctic* (Washington, DC: Government Printing Office, 2013); Congressional Research Service, *Changes in the Arctic: Background and Issues for Congress* (Congressional Research Service, 2016); Department of the Navy, *The United States Navy Arctic Roadmap for 2014 to 2030* (Washington, DC: Government Printing Office, 2014); Department of Homeland Security, *United States Coast Guard Arctic Strategy* (Washington, DC: Government Printing Office, 2013).

stationed in the Arctic, does not have a documented strategy describing the current desired capabilities and intent of the US Army. This may be misaligned with national policy.

The US DoD defines its Arctic end state as: "A secure and stable region where US national interests are safeguarded, the United States homeland is protected, and nations work cooperatively to address challenges."[8] The US Army has been given several tasks to support these objectives and is currently fulfilling those requirements, however, several operational gaps created by ongoing climate change and international agreements have been identified. Many of these operational gaps have been addressed by other Arctic nations such as Canada, Russia, and Norway through the innovative use of the land domain in relation to the other more prominent Arctic domains of sea and air. The US land domain's ability to meet the American national security objectives is constricted through a complicated command structure, limited infrastructure, and complex logistical requirements.

Given the increased importance of the Arctic, it is imperative to understand the strategic context that shapes the geopolitical environment. Changes to the environment are creating opportunities for resource extraction and access to Sea Lines of Communication (SLOC), but are also creating challenges related to national sovereignty. Arctic and near-Arctic nations have approached this problem and designed innovative solutions. It is only through a review of the Arctic strategic context that the US Army can determine if its current capabilities match the requirements outlined by the US DoD and US national policy.

The Operational Environment

Understanding climate change in the Arctic provides the cognitive foundation required to evaluate the emerging geostrategic context.[9] Analysis of the changing Arctic environment define

[8] US Department of Defense, *Arctic Strategy* (Washington, DC: Government Printing Office, 2016), 3.

[9] Jakub J. Grygiel, *Great Powers and Geopolitical Change* (Baltimore: Johns Hopkins University Press, 2006), 22.

the Arctic in geographical terms combing definitions from international institutions to American policy. Secondly, the analysis will define the expected environmental changes and impacts to resource availability, the viability of the NWP or NSR, and terrestrial activities. Finally, the monograph will identify key international institutions and conventions that will directly impact the geopolitical environment of the Arctic. Defining the Arctic is reminiscent of historian John Lewis Gaddis's observation that evaluating the past is not bound by time and space but by scope and scale.[10]

The United States Arctic Research and Policy Act of 1984 defines the Arctic as: "Arctic means all United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers [in Alaska]; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas; and the Aleutian chain."[11] This classification includes some parts of Alaska below the Arctic Circle, including the Aleutian Islands, the Seward Peninsula, and Yukon Delta. Additional United States documents provide a geopolitical Arctic definition as the land and sea area north of the Arctic Circle, which includes the northernmost third of Alaska, the Chukchi Sea, large parts of Russia, the Yukon and Northwest Territories in Canada, Greenland (Denmark), parts of Norway, and Finland.[12] Figure 1.1 illustrates the United States Arctic Research and Policy Act of 1984's definiton combined with the greater geopolitical view. Other common Arctic descriptions include environmental factors such as average temperature, the northern tree

[10] John Lewis Gaddis, *The Landscape of History: How Historians Map the Past* (Oxford: Oxford Univ. Press, 2004), 25.

[11] *Arctic Research and Policy Act of 1984*.

[12] Congressional Research Service, *Changes in the Arctic*, 12.

line, the extent of permafrost on land, or the extent of sea ice on the ocean.[13] This monograph will define the Arctic by geopolitical and geostrategic boundaries.

Figure 1.1. Definition of the Arctic. Source: Department of the Navy, *The United States Navy Arctic Roadmap for 2014 to 2030* (Washington, DC: Government Printing Office, 2014), figure 1.

Expected Changes in the Arctic

There are multiple state and international institutions that monitor climate change and its expected impacts on the global environment. In the Arctic region, the Intergovernmental Panel on Climate Change (IPCC) and the Arctic Council both routinely publish scientific reports and

[13] O.A. Anisimov et al., "2007: Polar Regions (Arctic and Antarctic)," in *Climate Change 2007: Impacts, Adaptation and Vulnerability*, ed. M.L. Parry et al. (Cambridge: Cambridge University Press, 2007), 653–685.

projections on climate and environmental conditions. The Arctic Council reports are more specific to the operating environment, while the IPCC is more inclusive of other global regions. By mid-century, the Arctic Council and the IPCC predict Arctic temperatures will continue to rise, resulting in four environmental impacts: (1) the Arctic Ocean largely free of sea ice during the summers of the late 2030's; (2) continued melting of permafrost and ground ice; (3) rising global sea-levels; (4) habitat shift for vegetation and animals.[14]

The rising Arctic temperature will create a variety of effects by mid-century. Currently, average temperatures are 1.8ºC higher than the average from 1961-1990. In January 2016, they were 5ºC warmer than the last thirty year average. In October-November of 2017, the temperatures were even higher with an average of 9ºC above historical norms. This temperature increase, combined with warmer, moist winds from the North Pacific, contribute to a reduction of sea ice extent and thickness of perennial ice. Additionally, as the mean temperature rises, snow cover may be reduced by 10-20% by 2050.[15] This reduction will most likely occur in the coastal areas of Alaska and Scandinavia. In the higher latitudes, the Arctic will see an increase in snow cover because of more water in the atmosphere and warmer temperatures. Finally, rising average temperatures will continue to melt the permafrost and land ice, lending to numerous impacts on land-based operations.[16]

[14] Rajendra K. Pachauri et al., *Climate Change 2014: Synthesis Report: Summary for Policy Makers* (Geneva, Switzerland: IPCC, 2014), 3–14; Richter-Menge et al., *2017: Arctic Report Card 2017*, 2.

[15] Arctic Monitoring and Assessment Programme, *AMAP Assessment Report: Arctic Pollution Issues* (Oslo: The Programme, 1998), 11.

[16] Brian Resnick, "We're Witnessing the Fastest Decline in Arctic Sea Ice in at Least 1,500 Years," *Vox*, December 12, 2017, accessed December 14, 2017, https://www.vox.com/energy-and-environment/2017/12/12/16767152/arctic-sea-ice-extent-chart.

The reduction of sea ice will also likely continue. Historical lows of minimum sea ice extent occurred in 2007, 2012, and 2017.[17] The annual mean of decrease is in the range of 3.5 to 4.1% per decade. The IPCC forewarns with high confidence that the most rapid decrease is in the summer extant.[18] These figures lead scientists to conclude that the Arctic will change from an ice-covered environment to a recurrent ice-free ocean as soon as the late 2030's.[19] Figure 1.2

Figure 1.2 This graphic compares the 30-year sea ice minimum average with the 2012 historical minimum, inside the red line. Source: Department of the Navy, *The United States Navy Arctic Roadmap for 2014 to 2030* (Washington, DC: Government Printing Office), 2014, figure 3.
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[17] Congressional Research Service, *Changes in the Arctic*, 20.

[18] Pachauri et al., *Climate Change 2014*, 4.

[19] John E. Walsh et al., "A Database for Depicting Arctic Sea Ice Variations Back to 1850," *Geographical Review* 107, no. 1 (January 2017): 89–107.

illustrates the rapid decline over the last three decades. Additionally, it is important to note that the older sea ice that has survived multiple summers is also rapidly disappearing and being replaced by first year or perennial ice. Perennial ice enables easier navigation for Arctic equipped ships, but is also an indicator that the environment is entering a new norm.[20]

The diminishing sea ice is critical for a number of reasons: (1) allowing access to previously denied locations for the purpose of mineral or hydrocarbon extraction; (2) permitting the passage of commercial ships between the Atlantic and Pacific Oceans; (3) expanding locations for commercial fishing; (4) generating additional sovereignty disputes among the Arctic nations as the resources mentioned above become more accessible.[21]

By mid-century, the rapid changes in temperature and sea ice extent will likely create more opportunities for hydrocarbon exploration and extraction. The United States Geological Survey suggests that more than 30% of the world's undiscovered gas and 13% of global undiscovered oil reserves may be in the Arctic, with the largest deposit located immediately off the North Coast of Alaska.[22] With such projections for available resources, it is reasonable to expect economic activity in the Arctic to intensify as environmental conditions allow.

As early as the 2030's, diminishing sea ice will increase the likelihood that the NWP and NSR will be reliably available for commercial use during the late summer months. Figure 1.3 illustrates the general routes for both the NSR and NWP. The NSR is exclusively claimed by Russia and consists of 2,600 nautical miles along Russia's northern border from Murmansk to

[20] Congressional Research Service, *Changes in the Arctic*, 2.

[21] R. T. Watson et al., eds., *The Regional Impacts of Climate Change: An Assessment of Vulnerability* (New York: Cambridge University Press, 1998), 3.3.1.

[22] Huebert, "U.S. Arctic Policy: The Reluctant Arctic Power," 196; Congressional Research Service, *Changes in the Arctic*, 28.

Provideniya. The NSR is projected to decrease transit time for ships traveling between Asia and Northern Europe, a fact supported in 2017 with the first Russian oil tanker to crossing the NSR

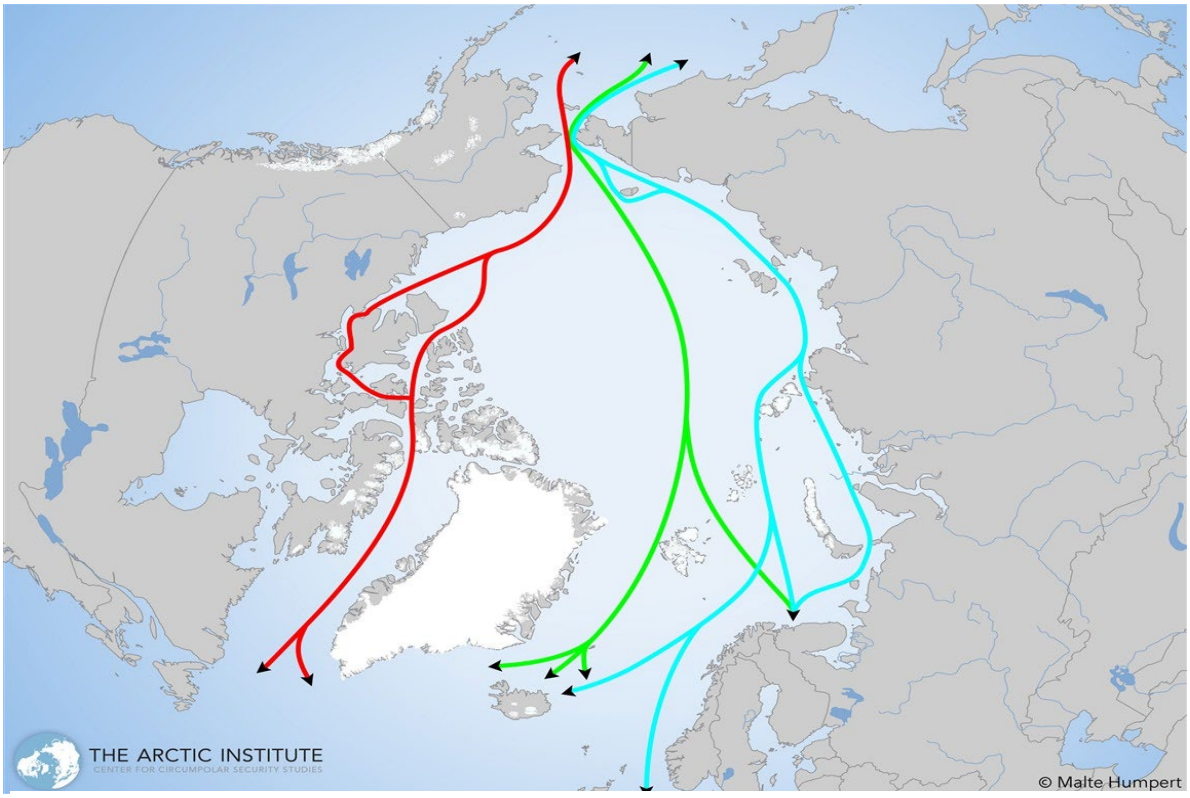

Figure 1.3. Potential SLOCs through the Arctic Ocean. Source: "The Future of Arctic Shipping," *The Arctic Institute*, last modified October 11, 2012, accessed February 25, 2018, https://www.thearcticinstitute.org/future-arctic-shipping/.

without an icebreaker escort at approximately a 30% faster rate than the normal route through the Suez Canal.[23] The NWP is comprised of several routes that circumnavigate the Canadian Arctic Islands, providing a viable trade route from Northeast Asia to the east coast of North America. The NSR and NWP represent another economic opportunity in the Arctic that will increase the number of stake holders interested in the Arctic operational environment. The utility of the Arctic as a commercial center is limited by the lack of permanent enabling infrastructure such as deep-water ports, refueling stations, search and rescue bases, and navigation beacons. For sea lanes of communication and hydrocarbon resource extraction to be economically viable, an increase in

[23] Jethro Mullen, "Tanker Becomes First to Cross Arctic without Icebreaker," *CNNMoney*, last modified August 25, 2017, accessed February 25, 2018, http://money.cnn.com/2017/08/25/news/arctic-ice-tanker-ship/index.html.

land based permanent infrastructure and logistical networks will be required. Increasing infrastructure will be limited due to melting permafrost, which is another consequence of ongoing climate change.[24]

Permafrost is defined as ground that remains at or below 0ºC for two or more consecutive years, and nearly all the landmass in the Arctic is underlain by permafrost.[25] During the summer months, the presence of ground ice, such as glaciers, protect the permafrost layers. Subsequently, removal of the ground ice exposes the permafrost to melting. Currently, the Arctic is losing 375 gigatons of ground ice per year, which will also trigger rises in sea-level. Such a sea-level increase will contribute to the erosion of the Arctic Ocean coastline, where the preponderance of existing infrastructure is located.[26] Permafrost and ground ice melting continues, with near-surface permafrost warming more than .5ºC since 2009. The layer of permafrost that thaws during the summer months has also, on average, deepened over the last thirty years.[27] By the year 2050, the IPCC forecasts an additional 20% loss of permafrost. The IPCC also reports with medium confidence that widespread loss of permafrost will trigger erosion or subsidence of ice-rich landscapes.[28]

Coastal and interior erosion, the creation of surface water, and the spread of boreal forest are all expected by the IPCC as a result of permafrost reduction.[29] Melting permafrost or

[24] Watson et al., *The Regional Impacts of Climate Change*, 3.3.9.

[25] Niels Weiss, "Permafrost Carbon in a Changing Arctic: On Periglacial Landscape Dynamics, Organic Matter Characteristics, and the Stability of a Globally Significant Carbon Pool" (PhD diss., Stockholm University, 2017), 1.

[26] Arctic Monitoring and Assessment Programme, *Snow, Water, Ice and Permafrost in the Arctic; Summary for Policy-Makers* (Oslo: Arctic Council, 2017), 4.

[27] R. K. Pachauri, Leo Mayer, and Intergovernmental Panel on Climate Change, ed., *Climate Change 2014: Synthesis Report* (Geneva, Switzerland: Intergovernmental Panel on Climate Change, 2015), 70.

[28] Arctic Monitoring and Assessment Programme, *Snow, Water, Ice and Permafrost in the Arctic; Summary for Policy-Makers*, 4.

[29] Watson et al., *The Regional Impacts of Climate Change*, 3.3.9.

permafrost degradation impacts the ice-rich silt layer normally associated beneath the subgrade of manufactured structures such as roads, airfields, and buildings. The degradation creates a seasonally unstable base, causing roads and airfields to undulate as the permafrost beneath them expands and contracts due to freezing and thawing as it is no longer thermally stable.[30] Permafrost degradation also influences non-permanent infrastructure, such as ice roads, as evidenced by a shift in the opening of ice roads from November (prior to 1991) to more recent years in which the roads do not open until January.[31] Economic impacts of coastal and interior erosion are estimated to increase maintenance costs in Alaska by 10-20% or $6.1 billion by 2030.[32] Diminishing sea and land ice is expected to accelerate the exploitation of Arctic natural resources. Additionally, changes to the environment are expected to negatively impact the current and future infrastructure required to support the forecasted increase in economic activity. Increased governance through international and multilateral institutions are required in the Arctic to facilitate discussions on economic, sovereignty, and environmental issues.

International and Multilateral Institutions

There are three primary institutions that are relevant to understanding the Arctic geopolitical context: The Arctic Council, United Nations Convention on Law of the Sea (UNCLOS), and the North Atlantic Treaty Organization (NATO). The Arctic Council was created in the summer of 1996 and is composed of eight Arctic states: The United States, Canada, Russia, Iceland, Denmark, Norway, and Finland.[33] Member states volunteer to serve as the chair

[30] Richard Fortier, Anne-Marie LeBlanc, and Wenbing Yu, "Impacts of Permafrost Degradation on a Road Embankment at Umiujaq in Nunavik (Quebec), Canada," *Canadian Geotechnical Journal* 48, no. 5 (May 2011): 735.

[31] Congressional Research Service, *Changes in the Arctic*, 33.

[32] Peter H. Larsen et al., "Estimating Future Costs for Alaska Public Infrastructure at Risk from Climate Change," *Global Environmental Change* 18, no. 3 (August 1, 2008): 1.

[33] Permanent participants granted observer status are: France, Germany, Italy, Japan, The Netherlands, China, Poland, India, Republic of Korea, Singapore, Spain, Switzerland and the United Kingdom."Observers - Arctic Council," accessed February 24, 2018, http://www.arctic-council.org/index.php/en/about-us/arctic-council/observers.

for two years. Finland assumed the role of current chair from the United States in the spring of 2017. The Council consits of six working groups dedicated to resolving issues of geopolitical importantce.[34] Within the various working groups, the Arctic Council has concluded several key multinational agreements since its inception: (1) Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic; (2) Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic; (3) Ongoing negotiations for an Agreement on Enhancing International Arctic Scientific Cooperation.[35]

Arctic security concerns are relegated to bilateral and multilateral cooperative security agreements. The most prominent cooperative security agreement is NATO, whose membership includes five of the eight Arctic nations.[36] Despite increased pressure from NATO's Nordic States for a more active security role in the Arctic, NATO has not adopted an official Arctic posture. This is due in part to opposition from Canada to NATO involvement in the Western Arctic. However, in Europe, NATO works closely with Finland and Sweden in deterring recent Russian aggression following the 2014 Russian annexation of Crimea.[37] Despite the lack of a multilateral security agreement, the most likely future point of friction between Arctic states is over access to natural resources and SLOCs. Disappearing sea ice will provide opportunities for

[34] Arctic Council's six working groups: (1) the Arctic Contaminants Action Program; (2) the Arctic Monitoring and Assessment Program; (3) Conservation of Arctic Flora and Fauna; (4) Emergency Prevention, Preparedness and Response; (5) Protection of the Arctic Marine Environment; and (6) the Sustainable Development Working Group."Working Groups - Arctic Council," accessed February 24, 2018, http://www.arctic-council.org/index.php/en/about-us/working-groups.

[35] Congressional Research Service, *Changes in the Arctic*, 52.

[36] NATO is a 29-member alliance of which the Arctic nations of the United States, Canada, Norway, Iceland and Denmark belong to. NATO, "Member Countries," *NATO*, accessed February 24, 2018, http://www.nato.int/cps/en/natohq/nato_countries.htm.

[37] Congressional Research Service, *Changes in the Arctic*, 55.

coastal economic expansion and the UNCLOS offers a forum in which to mediate these disputes.[38]

UNCLOS provides a forum for Arctic nations to resolve territorial disputes or claims that primarily concern the extensions of Economic Exclusion Zones (EEZ). UNCLOS allocates 200 nautical miles of outer edge continental shelf as the extent of sovereignty, but if the continental shelf can be proven to extend beyond the 200 nautical miles, a nation can submit a claim to UNCLOS for inclusion of that territory.[39] With projected changes in sea ice and additional hydrocarbon availability, UNCLOS is becoming a critical factor in assisting Arctic nations to negotiate territorial claims. Four Arctic nations have submissions to UNCLOS for extensions of their continental shelf to gain access to oil, gas, and minerals. As the sea ice continues to recede, additional mapping will be possible, likely generating other disputes over maritime boundaries or freedom of navigation.[40]

Climate change in the Arctic will continue to create a decline in sea ice, which will produce favorable conditions for resource extraction and maritime shipping through the NWP and NSR. Melting of the permafrost will tax the already poor infrastructure and, with the expected increase in economic activity, create a demand for improved access. Environmental changes will impinge on legal regimes in the Arctic, requiring international bodies to reevaluate current norms.[41] Agreements such as the Arctic Coast Guard Forum indicate a desire of the littoral Arctic nations to address the expected changes. However, the opportunities for lucrative resource extraction and SLOC access create the potential for inter-state disagreements over sovereignty.

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[38] US Department of State, *Department of State Report on Arctic Policy* (Washington, DC: Government Printing Office, 2016), 27.

[39] Congressional Research Service, *Changes in the Arctic*, 14; Michael Byers, *Who Owns the Arctic? Understanding Sovereignty Disputes in the North* (Madeira Park: Harbour Publishing, 2014).

[40] US Department of State, *Department of State Report on Arctic Policy*, 7–9.

[41] Charles Emmerson, *Future History of the Arctic* (New York: PublicAffairs, 2010), 100.

The Arctic Five, members of the Arctic Council, NATO, and bilateral agreements will continue to shape the geopolitical environment within each nation's strategic narrative.

Strategic Context for the Arctic

The results of climate change are projected to increase economic activity in the Arctic, which will magnify the Arctic's geostrategic significance.[42] The United States, Norway, Denmark, and Canada appear to be conducting a united and coordinated policy of barring Russia from the riches of the shelf. It is obvious that this does not coincide with the economic, geopolitical, and defense interests of Russia, constituting a potential threat to its national and economic security.[43] Since the end of the Cold War, the future of an Arctic confrontation is a fragmented set of challenges involving questions of sovereignty, access to recently discovered natural resources, and freedom of navigation through new SLOCs. During the Cold War, the Arctic existed as a geopolitical environment allowing the United States and USSR to execute nuclear deterrence both under and over the Arctic ice. With the collapse of the USSR, the Arctic remains a geopolitical environment, but the geostrategic significance has shifted. The new geostrategic goals reflected in the published Arctic strategy of the United States, Canada, Russia, Nordic States, and near-Arctic states emphasize sovereignty, resource extraction, and access to ice-free SLOCs.[44]

US Strategic Context

The United States' contemporary understanding of the geostrategic significance of the Arctic is changing as other Arctic and near-Arctic nations posture to take advantage of the

[42] Robert D. Putnam, "Diplomacy and Domestic Politics: The Logic of Two-Level Games," *International Organization* 42, no. 3 (1988): 441.

[43] Timothy Heleniak, "Regional Distribution of the Muslim Population of Russia," *Eurasian Geography and Economics* 47, no. 4 (2006): 426–448.

[44] Ian G. Brosnan, Thomas M. Leschine, and Edward L. Miles, "Cooperation or Conflict in a Changing Arctic? Opportunities for Maritime Cooperation in Arctic National Strategies," in *The Fast-Changing Arctic, Rethinking Arctic Security for a Warmer World*, ed. Barry Scott Zellen (Calgary: University of Calgary Press, 2013), 83.

recently available resources and SLOCs. In 2013, the United States published the National Security for the Arctic Region (NSAR), which established an overarching national approach to national security interests, stewardship, and regional cooperation in the Arctic.[45] The 2013 NSAR arranged the national approach along three lines of effort: sovereignty, natural resources, and freedom of navigation. These lines of effort are further defined in the United States Department

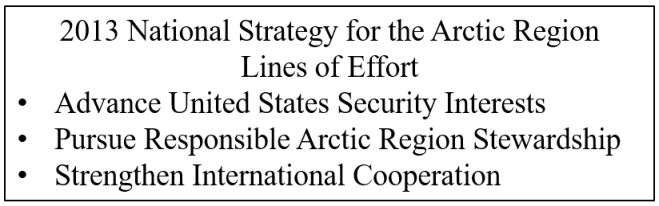

Figure 2.1. 2013 NSR Lines of Effort. Source: Barack Obama, *National Security for the Arctic* (Washington, DC: Government Printing Office, 2013), 3.

of State (DoS) 2016 *Report on Arctic Policy*. The catalyst for the NSAR was a heightened awareness of the relationship between climate change and increased economic activity. The United States understands that diminishing land and sea ice is altering ecosystems, allowing increased resource availability while simultaneously degrading existing infrastructure and requiring new governance.[46] The NSAR reveals the United States' understanding of the Arctic is regionally framed in Alaska by the Chukchi Sea, Beaufort Sea, and the Bering Strait. Regionally, it is in Alaska that the United States focuses on sovereignty and resource protection.[47] Globally, the United States recognizes the international value of freedom of navigation through a viable NWP and the NSR. Additionally, the United States seeks to foster bilateral and multilateral cooperation for missile defense against threats to the United States homeland and European

[45] Obama, *National Security for the Arctic*, 3.

[46] Ibid., 4.

[47] George W. Bush, *National Security Presidential Directive/NSPD 66, "Arctic Region Policy"* (January 9, 2009), 2.

allies.[48] The basis of any discussion on US Arctic policy begins with defining tensions over two international boundary disputes.

The United States' current maritime boundary disputes with Canada and Russia are characterized by the changing environmental conditions and interpretations of international law, such as UNCLOS. As the sea ice continues to melt and access to Alaska's one billion offshore acres is expanded, the United States can expect to negotiate an extension of its EEZs.[49] The United States is also expected to use article 37 of UNCLOS, which defines routes that connect two oceans as transit passages available to use by commercial shipping, justifying access to the NWP.[50] However, as a non-signatory member of UNCLOS, the United States is unable to file an official claim for an extension of its EEZs, which forces the United States to propose these agreements bilaterally. The United States has potentially overlapping EEZs with Russia and Canada.[51]

Russia and the United States abide by a maritime boundary established in 1990 when the USSR still existed. The agreement has been ratified by the Senate but not by the Russian Federation Duma.[52] From the American perspective, the boundary issue is resolved, but until the Russian Duma takes similar actions, the Russians will maintain this as an open issue. However, cooperation continues, as evident in November 2017, when the International Maritime Organization published a proposal to establish two-way maritime routes through the Bering Strait.[53]

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[48] Huebert, "U.S. Arctic Policy: The Reluctant Arctic Power," 191.

[49] Congressional Research Service, *Changes in the Arctic*, 27.

[50] Oceans and Law of the Sea, *United Nations Convention on the Law of the Sea of 10 December 1982* (Singapore: United Nations, 1982), 33.

[51] Huebert, "U.S. Arctic Policy: The Reluctant Arctic Power," 209.

[52] Congressional Research Service, *Changes in the Arctic*, 27.

[53] International Maritime Organization, *Routeing Measures and Mandatory Ship Reporting Systems* (United Kingdom: United Nations, 2017), 7.

The United States' second significant boundary dispute is with Canada and concerns access to the NWP. Canada maintains that the NWP historically has existed in internal waters and, therefore, is only applicable to article 17 of UNCLOS, Innocent Passage and not article 37, Transit Passage. The United States maintains that the NWP connects the Atlantic Ocean to the Arctic Ocean, meaning that the NWP exists in international waters and is available for transit for commercial shipping. While this dispute is significant, the US DoS assumes that the United States and Canada will continue to work around this issue.[54] Unfortunately, disappearing sea ice will allow extended mapping of the Arctic, which in turn, will likely create additional boundary disputes between the United States, Canada, and Russia as each seek to enlarge their EEZs.[55] The United States can be expected to continue to negotiate these future disputes through bilateral and multilateral negotiations, as well as working within the Arctic Council.

Canada

Canada's geostrategic views of the Arctic have changed significantly since the end of the Cold War. During the Cold War, Canada viewed the Arctic as a deterrent to both Soviet nuclear and conventional forces. Following the end of the Cold War, Canada reduced its military presence in the Arctic and only relied on soft power and sovereignty patrols with Canadian Armed Forces reserve Rangers to maintain a forward presence.[56] A renewed interest in the Canadian Arctic has emerged in recent years primarily due to opportunities for natural resource extraction, transit of the NWP, projection of sovereignty, and governance.[57] Canada seeks strong international partners and is a member of the Arctic Council, UNCLOS, and NATO. However,

[54] Congressional Research Service, *Changes in the Arctic*, 27.

[55] Ibid., 16.

[56] Adam Lajeunesse, "The CAF Returns to the Arctic, 2000-2006," in *Canadian Arctic Operations, 1941-2015 Lessons Learned, Lost, and Relearned*, ed. Adam Lajeunesse and P. Whitney Lackenbauer (Fredericton: University of New Brunswick, 2017), 307; Joseph S Nye, *The Future of Power* (New York: Public Affairs, 2012).

[57] Brosnan, Leschine, and Miles, "Cooperation or Conflict in a Changing Arctic? Opportunities for Maritime Cooperation in Arctic National Strategies," 91.

Canada maintains several unresolved disputes pertaining to Arctic territorial claims. Canada claims part of the Lomonosov Ridge with Russia and is at odds with Denmark over the Hans Islands. UNCLOS is arbitrating Canadian territorial claims, apart from a disagreement with the United States over potential EEZ extension in the Beaufort Sea, which contains rich oil and gas deposits. The dispute between Canada and the United States is being handled bilaterally as the United States is not a signatory of UNCLOS. These three disputes are important for potential natural resource exploitation. Internationally, Canada's most important claim is that the NWP is part of internal waters and thus subject to full Canadian sovereignty. The United States argues that the NWP meets the criteria of an international strait because it connects the Atlantic Ocean to the Arctic Ocean.[58] Canada has also resisted calls from other NATO members for an increased NATO presence in the Arctic as unnecessary and an infringement of its sovereignty.[59] Concerns over access and availability of national resources, in addition to preserving sovereignty, have shaped recent Canadian Arctic military strategy.

In 2011, Canada published its *Northern Strategy*, which introduced four pillars of strategic guidance.[60] Canadian military operations focus on the first pillar, preserving sovereignty. The remaining three pillars, promoting economic development, protecting the environment, and devolving governance, are indirectly impacted by Canadian military requirements.[61] Canada recognizes that ongoing climactic changes necessitate the need to maintain or enhance a stronger multi-domain presence in the Arctic. Canada is addressing its emphasis on Arctic sovereignty through unilateral, bilateral, and multilateral ways and means.

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[58] Byers, *Who Owns the Arctic?*, 42.

[59] Andrea Charron, *NATO, Canada and the Arctic* (Calgary, AB: Canadian Global Affairs Institute, September 2017), 1.

[60] Beate Steinveg, "Canada's Arctic Policy: Striking a Balance Between National Interests and Circumpolar Cooperation" (master's thesis, The Arctic University of Norway, 2014), 49.

[61] Elizabeth Riddell-Dixon, *Canada's Arctic Policy* (The University of Western Ontario: The Canada-US Institute Research Note, 2012), 1.

Unilaterally, Canada has increased the number of maritime sovereignty patrols, returning to the Hudson Bay in 2002, with Operation Narwhal. Operation Narwhal consisted of two Canadian Coast Guard ocean vessels tasked to conduct a sovereignty patrol. During Operation Narwhal, the Canadian Coast Guard experienced difficulties with refueling, over the horizon communications, icebreaker availability, and navigation. These operational problems reveal the need for innovative solutions to offset the limited infrastructure present in the Arctic. Exercise Hudson Sentinel, the follow-on operations in 2005, exposed additional challenges on maritime operations in a region where infrastructure is limited. One Canadian naval vessel, HMCS *Glace Bay,* required replacement parts that could not be flown to the vessel or even to the closest First Nation village due to poor weather. In time, the part was flown to a gravel strip, offloaded to a Canadian Ranger patrol, transported by ground via all-terrain vehicles, and then shipped to the HMCS *Glace Bay* via a small boat. Canadian sovereignty operations have continued to expand in scope and scale with coordination and supply remaining the most daunting problems.[62] Helping to ease the expansion of Canadian military activity in the Arctic are the newly-minted Arctic Response Company Groups (ARCG).

The ARCGs are company-sized elements of 150 soldiers that are light, flexible forces trained to operate in the extreme Arctic operational environment. The Canadian Armed Forces have determined that the average soldier is unable to operate effectively under the harsh Arctic conditions and more time is spent providing logistics to those soldiers than to the mission itself. As such, the ARCGs are designed to operate in support of the Canadian Rangers and other Canadian Armed Forces conducting Arctic operations, such as the HMCS *Glace Bay* mission.[63]

To support a growing military presence in the Arctic, Canada has undertaken two large infrastructure projects that will enhance multi-domain capabilities. The first project is a deep-

[62] Lajeunesse, "The CAF Returns to the Arctic, 2000-2006," 326.

[63] Ibid.

water port near the town of Navisivik supporting NWP refueling and search and rescue. The second project is a Canadian Army logistical hub at Resolute Bay.[64] The unilateral actions through the creation of the ARCG, increased maritime patrols, and infrastructure improvements complement bilateral and multilateral agreements with the United States, Arctic, and near-Arctic nations.

Arguably, Canada's most important bilateral agreement of geopolitical importance in the Arctic is with the United States concerning strategic deterrence as an equal partner of the North American Aerospace Defense Command (NORAD). Canada seeks to improve multilateral relationships in the Arctic through the conduct of annual combined joint military exercises such as Nanook, Nunakput, and Nunalivut.[65] These exercises focus on interoperability between domains and nationalities, most notably, the United States and Denmark. Canadian perceptions of Arctic sovereignty issues drive subsequent policy objectives through unilateral, bilateral, and multilateral relations with Arctic and near-Arctic states. The resurgence of interests in the Arctic has led the Canadian Armed Forces to reframe how they view Arctic operations and enabled some innovative solutions to the problems of logistics and interoperability between domains.

Nordic Countries (Denmark, Norway, Sweden, Iceland, and Finland)

The Nordic countries coordinate with each other to forge a collective stance on Arctic issues while simultaneously pursuing independent economic interests. The Arctic climate is less severe on the European continent than in North America, allowing a heavier population density

[64] Sara Frizzell, "Nanisivik Naval Refueling Facility in Nunavut on Track and on Budget for Fall 2018 Opening," *CBC News*, July 10, 2017, accessed December 11, 2017, http://www.cbc.ca/news/canada/north/nanisivik-arctic-bay-naval-refueling-2018; "Military's Arctic Training Facility Opens in Resolute," *CBC News*, accessed December 11, 2017, http://www.cbc.ca/news/canada/north/military-s-arctic-training-facility-opens-in-resolute-1.1411838.

[65] Steinveg, "Canada's Arctic Policy: Striking a Balance Between National Interests and Circumpolar Cooperation," 47.

near the Arctic circle.[66] As such, the strategic approaches between North American Arctic countries and the Nordic states often differ. Collectively, the Nordic nations prioritize sovereignty, Arctic maritime security, and freedom of navigation through the NWP and NSR.[67] The Nordic countries all view international organizations favorably in terms of dispute resolution. The Nordic countries are all members of the Arctic Council and UNCLOS. Only three of the Nordic states belong to NATO: Norway, Denmark, and Iceland. Norway is the only Arctic NATO country that shares a land border with Russia and among these it is also the only nation with its military command headquarters stationed north of the Arctic Circle. Additionally, Norway derives 90% of its GDP from ocean-based activities, which makes its resource access disputes with Russia more acute. As a result, Norway is the most likely of the Nordic countries to experience friction with Russia. Fortunately, Norway and Russia have resolved their boundary dispute in the Barents Sea, but access over Svalbard remains continuous.[68] The collective security agreements provided by NATO affords a certain level of soft power as described by international relations theorist Joseph Nye, when the NATO Nordic states are negotiating sovereignty disputes with Russia. Sweden and Finland, as non-NATO members, do not have that luxury.[69]

As the Arctic environment continues to evolve, the Nordic states will be expected to pursue similar national security interests as a collective entity as well as through bilateral agreements. Denmark's inclusion of Greenland, Norway's Svalbard archipelago, and Iceland's strategic location place these Nordic states within the North American national security interests

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[66] Arctic Monitoring and Assessment Programme, *Snow, Water, Ice and Permafrost in the Arctic; Summary for Policy-Makers*, 17.

[67] Katarzyna Zysk, "Russia's Arctic Strategy: Ambitions and Restraings," in *The Fast-Changing Arctic, Rethinking Arctic Security for a Warmer World*, ed. Barry Scott Zellen (Calgary: University of Calgary Press, 2013), 326.

[68] Wrenn Yennie Lindgren and Nina Græger, "The Challenges and Dynamics of Alliance Policies: Norway, NATO and the High North," in *Global Allies; Comparing US Alliances in the 21st Century* (ANU Press, 2017), 108, accessed August 30, 2017, http://www.jstor.org/stable/j.ctt1sq5twz.10.

[69] Nye, *The Future of Power*, 21–22.

concerning Russia. The Nordic states can also be expected to be courted by near-Arctic nations, such as China, as these countries posture themselves to exploit Arctic natural resources and SLOCs.

Russia

Due to security concerns and economic potential, the Arctic is of great significance to Russia.[70] Russian territory encompasses half of the Arctic area, coastline, population, and maritime shipping in the region, and it has always been part of Russian identity narratives. Today, Russia's Arctic generates an impressive amount of natural resource wealth, estimated at 95% of its natural gas, 75% of its oil, 96% of its platinum, and 90% of its nickel and cobalt.[71] This alone provides Russia with a solid reason to extend its influence over the Arctic. With diminishing sea ice, Russia views its Arctic coastline as a valuable future generator of revenue through the development of hydrocarbons, maritime shipping infrastructure, mineral extraction, and future commercial fishing. Current estimates indicate that the generation of 20% of all Russian GDP occurs north of the Arctic Circle.[72] Russia sees significant economic opportunities in offering icebreaker escorts, refueling ports, and access to maritime maintenance facilities to near-Arctic countries, such as China. Scientists estimate that the NSR along the Siberian coast will be ice-free before the NWP as evidenced by a steady increase in vessels traversing the route since 2011. Internal to Russian commerce, the NSR is projected to cut transportation times and costs for Russian ships.[73] Control of the NSR is vital to Russian security and economic interests and key to extending the extension of EEZs and resolving disputed territorial claims.

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[70] Alan C. Lamborn, "Theory and the Politics in World Politics," *International Studies Quarterly* 41, no. 2 (1997): 193.

[71] Marlene Laruelle, *Russia's Arctic Strategies and the Future of the Far North* (Hoboken: Taylor and Francis, 2015), 283.

[72] Marlene Laruelle, "Arctic 2014: Who Gets a Voice and Why It Matters," in *Wilson Center*, vol. Russia, 2014, 1–4.

[73] Congressional Research Service, *Changes in the Arctic*, 55.

Russia has made significant diplomatic overtures to resolve territory disputes over the last three decades. In 2010, Russia settled a 175,000 square kilometer, forty year national border dispute with Norway in the Varangerfjord area of the Barents Sea.[74] In 1991, the Soviet Union settled (but the new Russian Federation has not yet ratified) a dispute with the United States for overlapping EEZs in the Bering and Chukchi seas.[75] Russia has submitted several claims to UNCLOS, all of which are contested by the United States, Canada, and Norway. The UNCLOS claim includes the Lomonosov Ridge and the Alpha-Mendeleev Ridge as extensions of the continental Siberian Shelf into the Central Arctic Ocean, which includes 1.2 million square kilometers of potentially rich hydrocarbon deposits.[76] Finally, Russia maintains active membership in the Spitsbergen Treaty, which following World War I recognized full and absolute Norwegian sovereignty over the Svalbard archipelago but also afforded commercial rights to the ten signatories.[77] Russia is the only nation besides Norway and China to take advantage of this treaty and has established a small permanent settlement at Barentsburg. Russia will maintain a strategic interest in Svalbard over concerns that this is key terrain for further NATO missile defense expansion, degrading Russia's nuclear deterrence. Geography plays an important role concerning Russian access to the Atlantic Ocean and the fact NATO signatories are physically astride both the Bering Strait and the Greenland, Iceland, and United Kingdom gap, potentially restricting Russian freedom of navigation into the NSR. Russia fears that the denial of access through these choke points could limit the use of the NSR and undermine its access to the Atlantic Ocean. The aforementioned examples indicate that Russia's desire to settle territorial

[74] Laruelle, *Russia's Arctic Strategies and the Future of the Far North*, 68.

[75] Ibid., 66.

[76] Ibid., 61.

[77] Emmerson, *Future History of the Arctic*, 91. The use of absolute right in this context refers to the Liberalism Theory of international relations where all parties mutually benefit from political interaction.

disputes through bilateral and international institutions are at odds with its apparent Arctic re-militarization.

Russian Arctic military strategy is ambitious. The Kola Peninsula has returned to a state of heavy militarization, similar to its condition during the Cold War. According to the US DoS's 2016 *Report on Arctic Policy*, Russia views nuclear deterrence and their Arctic based submarines as the decisive strategic capabilities in the Arctic. It utilizes its other military forces stationed in and around the Arctic to protect those assets.[78]

Figure 2.2 Russia's Militarization of the Arctic. Source: Jeremy Bender, "Russia Just Put the Finishing Touches on 6 Arctic Military Bases," *Business Insider*, accessed February 26, 2018, http://www.businessinsider.com/russia-equipped-six-military-bases-in-the-arctic-2015-12.

[78] US Department of Defense, *Arctic Strategy*, 24.

Russia now tasks military forces to provide a means for Russia's strategic ways of nuclear deterrence, sovereignty, and protection of the NSR. In consequence, Russia has undertaken a construction surge in the Arctic with the planned construction of thirteen airfields, ten search and rescue stations, sixteen deep water ports, ten air defense radar stations, forty icebreakers, forty-two of Russia's seventy-two submarines, thrity-eight major surface warships, and the forward positing of three Arctic rifle brigades. In 2014, Russia established a Northern Joint Strategic Command charged with the protection of Russia's naval strategic forces, economic interests, navigation protections, and advancing Russia's foreign policy interests in the Arctic.[79] Russia's military focus appears to be concentrated on sea and air domains, with ground combat forces providing force protection, border interdiction, and cold weather training. Recent Russian land military exercises center on their protection of oil and gas installations, increased border patrols, and logistical support to Russian air and maritime forces. While Russia maintains significant strategic military assets on the Kola Peninsula, they view small-scale conflicts around energy deposits, smuggling, and environmental issues as the most likely future scenarios.[80]

Near-Arctic States

States from outside the Arctic region do not have territorial sovereignty in the Arctic but they do have geopolitical and geostrategic interests with respect to navigation, overflight, fishing, and hydrocarbon extraction. For export-dependent countries such as China and Germany, the Arctic SLOCs provide a way to increase profits by developing new, shorter trade routes. For growing economies such as India and China, the resource-rich Arctic offers opportunities for access to hydrocarbons. Bi-lateral agreements for SLOC usage and resource extraction, such as between Denmark and China, are common and should be expected to continue.[81] China, in particular, has expressed significant interest in the Arctic by signing agreements with Russia for

[79] Congressional Research Service, *Changes in the Arctic*, 51.

[80] Laruelle, *Russia's Arctic Strategies and the Future of the Far North*, 87.

[81] US Department of State, *Department of State Report on Arctic Policy*, 9.

resource exploration and SLOC escorts through the NSR. China has long been involved in Arctic affairs, joining the Spitsbergen Treaty in 1925, with utilization of that treaty in 2004 through creation of the Yellow River Research station. In January 2018, China published an Arctic strategy white paper, stating its policy goals for the Arctic: understand, protect, develop, and participate in the governance of the Arctic. Successful governance in the Arctic is measured by the creation of a Polar Silk Road, which develops new routes through the NSR and NWP and will cut 30-40% of the current ocean transit time to markets in Europe.[82] China's long term intent for the Arctic can be viewed through its willingness to spend capital on the purchase and maintenance of three icebreakers with one under construction.[83] Bilateral agreements, investment in Arctic infrastructure and equipment, and gaining accredited observer status to the Arctic Council demonstrates China's commitment to the Arctic.[84]

The Arctic as a global commons is not limited to state actors but also attracts a wide range of international institutions. There are nine inter-governmental and 11 non-governmental organizations that have observer status on the Arctic Council, all of which seek to promote the protection of indigenous populations, environmental protection, and sustainable development. International organizations such as the UN, and subsets of the UN, in particular the International Maritime Organization (IMO) and UNCLOS, have an interest in developing an appropriate measure to establish a polar code for maritime safety and security.[85] Relations between Arctic international organizations, non-state actors, Arctic nations, and near-Arctic nations constitute a

[82] Peoples Republic of China, "China's Arctic Policy."

[83] "Office of Waterways and Ocean Policy," accessed February 24, 2018, http://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Marine-Transportation-Systems-CG-5PW/Office-of-Waterways-and-Ocean-Policy/.

[84] "Office of Waterways and Ocean Policy," United States Coast Guard, accessed February 24, 2018, http://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Marine-Transportation-Systems-CG-5PW/Office-of-Waterways-and-Ocean-Policy/.

[85] US Department of State, *Department of State Report on Arctic Policy*, 19.

complex system of interdependencies and complex interwoven nodel structures reminiscent of complexity theories described by the physicist Yaneer Bar Yam.[86]

US Arctic Policy and Strategic Understanding

Both as a global superpower and because of its purchase of Alaska in 1867, the United States is an Arctic Nation. An official at US Northern Command desribed US Arctic strategy as "[o]ur overarching emphasis is on sustaining a peaceful, stable, and conflict-free Arctic region in support of the National Strategy."[87] However, the Arctic has seldom figured prominently in United States policy.[88] During the Cold War, the Arctic was a geostrategic arena of military competition between the United States and the USSR, with both countries operating elements of their second-strike weapon systems and early warning systems. With the collapse of the USSR in 1991, military competition decreased and the United States geostrategic goals in the Arctic slowly declined.[89] Contempoary US Arctic policy emphasizes sovereignty, resource protection, and freedom of navigation. The 2016 DoD strategy for the Arctic provides a number of ways and means that are nested within each of the NSAR's three lines of effort illustrated in figure 2.1. Furthermore, the DoD assigns mission responsibility, both specified and unspecified, to each of the four service branches in the Arctic. All four service branches, and the US Army in particular, are meeting their assigned tasks for the DoD's desired end state. Yet when the effects of climate change and the other regional stake holder actions are evaluated, it becomes apparent that there are capability gaps within the US Army. Those tensions can be desribed as inadquate infrastructure, logistics, and command structure.

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[86] Yaneer Bar-Yam, *Making Things Work: Solving Complex Problems in a Complex World* (Cambridge, MS: Knowledge Press, 2004), 53.

[87] US Northern Command, "Official Explains DOD's Role in National Arctic Strategy," *American Forces Press Service*, May 10, 2013, 1, accessed October 30, 2017, http://www.northcom.mil/Newsroom/Article/563640/official-explains-dods-role-in-national-arctic-strategy/.

[88] Huebert, "U.S. Arctic Policy: The Reluctant Arctic Power," 189.

[89] Congressional Research Service, *Changes in the Arctic*, 69.

The 2016 DoD strategy for the Arctic, describes the US Army's Arctic requirements. The 2016 DoD strategy for the Arctic states: "the Arctic is at a strategic inflection point as the ice cap is diminishing resulting in increasing economic opportunity and therefore resource protection is emphasized over defense."[90] A major deviation in the DoD 2016 strategy for the Arctic from the 2013 NSAR is that a reevaluation of the Arctic security environment was required. This reevaluation puts Arctic security ahead of resource protection.[91] The DoD's assessment of negative changes in the international security environment stems from Russian meddling in the Ukraine, Georgia, and Moldova. The 2016 DoD strategy for the Arctic has not identified any immediate threats to national security and, subsequently, no clear defensive lines of effort are mentioned. The DoD identifies its end state as a secure and stable region where United States national interests are safeguarded through the twin objectives of "ensuring security" and "prepare to respond."

"Ensuring security" in the Arctic encompasses a broad spectrum of activities, ranging from resource extraction and access to SLOCs to national defense. "Prepare to respond" is much more ambiguous but is oriented on sufficient force posture and infrastructure to support the broad spectrum of security activities. In terms of security, the DoD seeks to forge cooperative strategic partnerships that promote innovative and affordable security solutions through increased opportunities with Arctic partners, enhancing regional expertise and cold-weather operational experience as outlined in figure 3.1.[92] The DoD intends on meeting its two objectives, "ensuring security" and "prepare to respond" through a wide range of ways and means. To implement its strategy, the DoD has divided responsibility for the Arctic among several geographical and functional commands across the four-armed forces service components.

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[90] US Department of Defense, *Report to Congress on Strategy to Protect United States National Security Interests in the Arctic Region* (Washington, DC: Government Printing Office, 2016), 2.

[91] Ibid., 3.

[92] Ibid., 4.

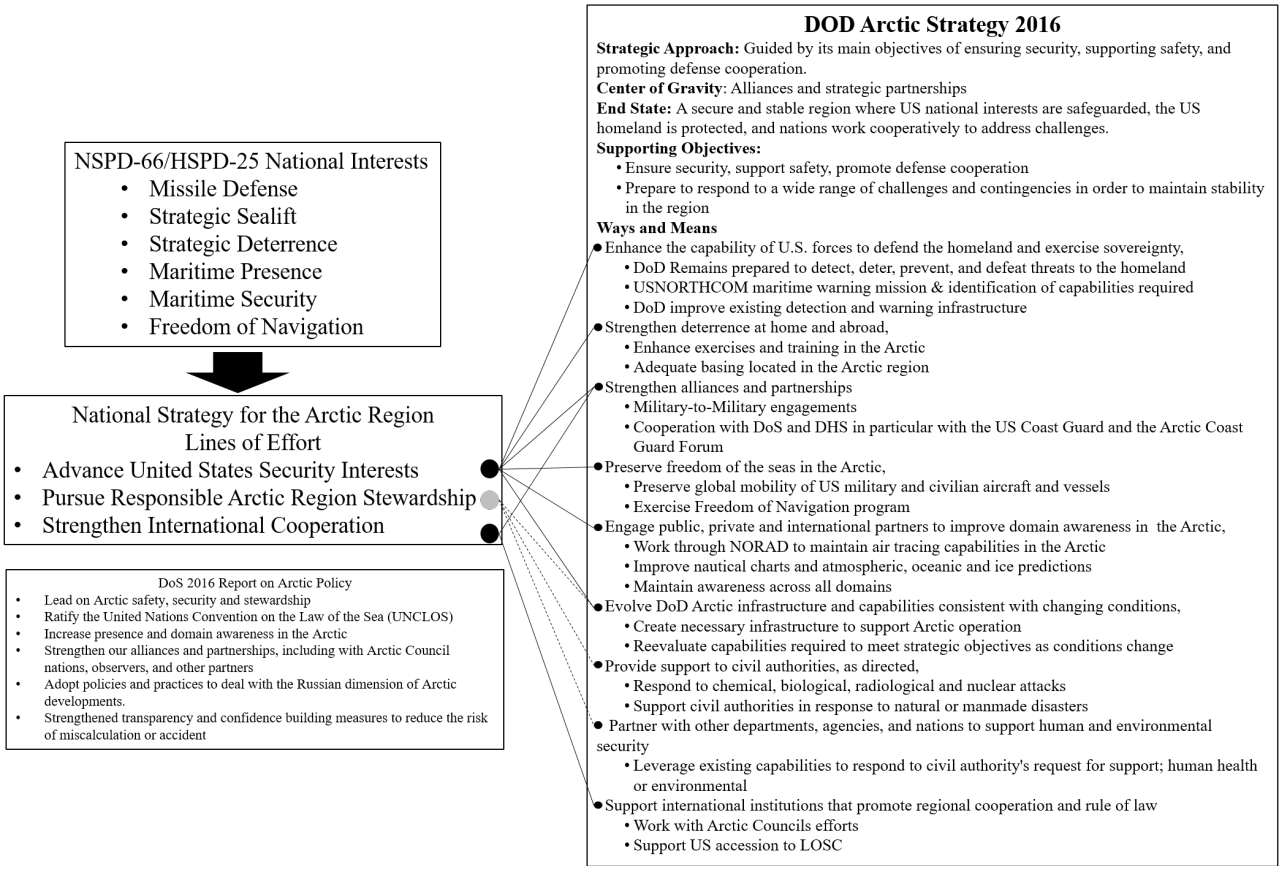

Figure 3.1 DoD Strategy for the Arctic. Source: US Department of Defense, *Arctic Strategy* (Washington, DC: Government Printing Office, 2016), 24; George W. Bush *National Security Presidential Directive/NSPD 66, "Arctic Region Policy."* January 9, 2009.

DoD Strategy for the Arctic, Implementation

The Arctic's geostrategic location at the confluence of three continents demands an overly complicated DoD command structure. The 2011 Unified Command Plan (UCP) describes this plan, identifying geographic areas of responsibility for geographic combatant commands, as outlined in figure 3.2. In the case of the Arctic, the 2011 UCP shared command responsibility between both US Northern Command (USNORTHCOM) and US European Command (USEUCOM).[93] USEUCOM contains six of the eight Arctic Council nations in its area of responsibility, but USNORTHCOM contains the North Pole itself.

[93] Congressional Research Service, *The Unified Command Plan and Combatant Commands: Background and Issues for Congress* (Congressional Research Service, 2013), 8.

USNORTHCOM is tasked with ensuring that the Arctic remains a secure and stable region where the United States' national interests are safeguarded. USNORTHCOM is also designated as the DoD advocate for Arctic capabilities, responsible for identifying requirements and associated gaps for the Arctic operational environment.[94] Within USNORTHCOM's area of responsibility, there are several other parallel commands as displayed in figure 3.3. The North American Aerospace Defense Command or (NORAD) is a bilateral United States-Canada

Figure 3.2. 2011 Unified Command Plan. Source: Congressional Research Service, *The Unified Command Plan and Combat Commands* (Washington, DC: Congressional Research Service, 2013), 65

organization founded in 1958. NORAD is responsible for aerospace warning, aerospace control, and maritime warning for North America.[95] Both NORAD and USNORTHCOM have merged most staff directorates, but still retain separate lines of command authority. Joint Alaska Command (ALCOM) is a subordinate unit to USNORTHCOM. ALCOM is responsible for

[94] Lori J. Robinson, *Statement of General Lori J. Robinson, United States Air Force Commander, Unites States Northern Command and North American Aerospace Defense Command* (Washington, DC: Government Printing Office, 2018), 13.

[95] Ibid., 8.

homeland defense, civil support, and security cooperation in the ALCOM area of operations. The ALCOM commander also commands the Alaskan NORAD, responsible for aerospace warning and maritime warning in the state of Alaska and surrounding waters.[96] ALCOM's area of responsibility contains multiple US Army, US Air Force, and US Navy units. ALCOM accomplishes its assigned tasks through operational control of the two US Air Force fighter wings, early warning radar, and US Army units assigned to the 49th Missile Defense Battalion, a component of the Alaska Army National Guard on permanent active duty, stationed at Fort Greely, Alaska. Operating parallel to ALCOM in the Arctic are the US Navy and US Coast

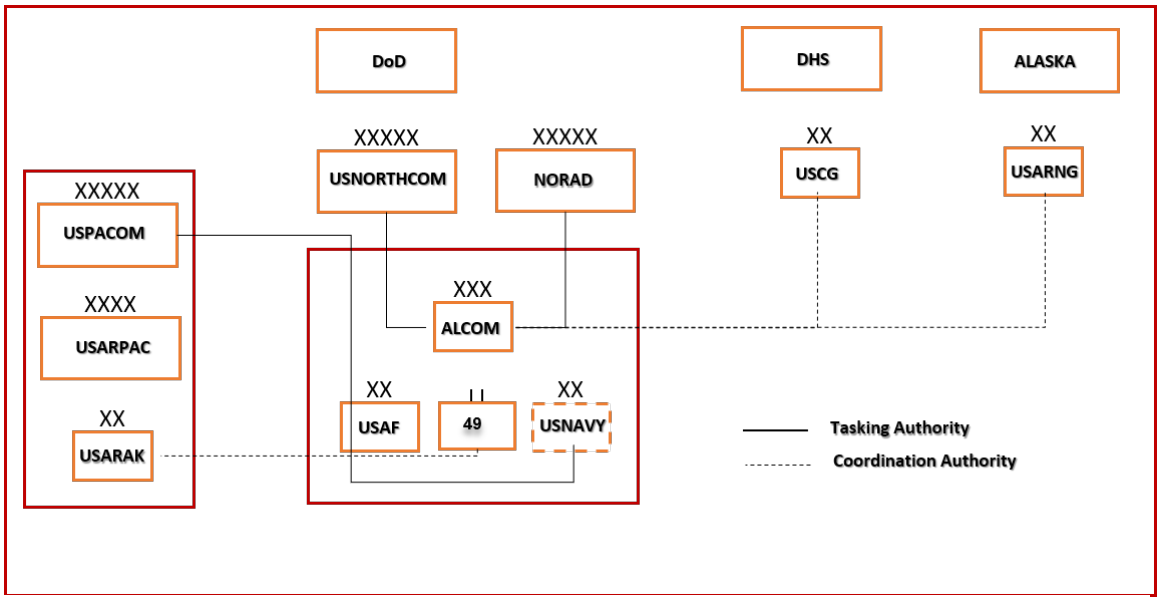

Figure 3.3. United States Government Stake Holder Relationship for the Arctic Region. Source: Author

Guard. Further US Army forces reside in Alaska under the US Army Alaska (USARAK) command, which is aligned under US Army Pacific (USARPAC) in Hawaii. USARAK maintains approximately a division-sized element of 21,000 soldiers. As illustrated in figure 3.3, the US Army forces belonging to USARAK do not have a command relationship with ALCOM.

[96] "Joint Base Elmendorf-Richardson > Units > Alaskan NORAD Region," accessed February 15, 2018, http://www.jber.jb.mil/Units/Alaskan-Norad-Region/.

In 2014, the US Navy published an *Arctic Road Map,* envisioning its responsibilities as providing USNORTHCOM with maritime security, freedom of navigation, and search and rescue. With the closure of the US Navy's only strategic base in Alaska, Ada Naval Air Station, the US Navy can only project power from ships whose home port is located south of the Arctic. As illustrated during the Canadian exercise Hudson Sentinel, the US Navy vessels are unable to fully sustain themselves during sustained operations. In order to provide an effective permanent maritime presence, the US Navy requires an Arctic deep-water port with assigned forces.[97] Lack of infrastructure creates extended lines of operation for each naval patrol and could be a contributor to there only being six patrols from 2009-2013.[98] The United States Department of Homeland Security (DHS) and its subordinate, the United States Coast Guard (USCG), have similar operating constraints as the US Navy, but have been much more active through the conduct of Operation Arctic Shield. Operation Arctic Shield conducts maritime domain awareness flights along Alaska's North Slope and over the Arctic Ocean. According to the USCG, Operation Arctic Shield is able to meet the United States commitments to the Arctic Council's agreement on search and rescue.[99] However, the absence of infrastructure inhibits the USCG and the US Navy from the necessary basing required for sustained operations. As human activity increases, there is a requirement for a permanent presence to respond to manmade and natural disasters.

Basing and Infrastructure

The impact of melting permafrost and coastal erosion create complex conditions for United States ground and maritime operations. As recent Canadian experiences have shown, building infrastructure is not the sole solution to the problem. Melting permafrost makes basing

[97] Department of the Navy, *The United States Navy Arctic Roadmap for 2014 to 2030*, 90.

[98] Ibid., 21.

[99] Department of Homeland Security, *Arctic Strategy Implementation* (Washington, DC: Government Printing Office, 2014), 6.

and associated infrastructure difficult to maintain and supply. Ground transportation along permanent roads requires significant resources to maintain and costs are only projected to increase as climate change becomes better understood. Aerial resupply is similarly complicated as extreme weather inhibits steady state operations. A lack of infrastructure has at times forced the US Navy and USCG to rely on third-party responders to Arctic incidents. In July 2007, the USCG was unable to assist a stranded twenty foot skiff near Barrow, Alaska, and had to rely on Shell Oil Company and the Canadian Coast Guard to provide assistance.[100] The DoD study on the Arctic has already identified these issues, directing the US Army Corps of Engineers to assess the feasibility of a deep-water port at Nome, Alaska, as part of a larger system of port facilities in the Arctic and sub-Arctic region.[101] The importance of infrastructure was emphasized in a February 2018 DoD report on the effects of sea-level rise, which identified Arctic infrastructure as a point of concern. The report warned about the impact of recent shore line erosion bordering strategic radar installations, limiting runway use to only small planes or helicopters. The larger planes, for which the runway was designed, can no longer use these facilities.[102] The effects of climate change on Arctic infrastructure, and its implication for national security, will impact the ability of the United States to meet Arctic Council agreements. To migrate the risks and meet US national security goals, the DoD can look to the US Army for additional Arctic capabilities.

US Army in the Arctic — Arctic Warriors

The US Army has not published an Arctic strategy similar to the US Navy or USCG, but it maintains significant forces in Alaska under USARAK.[103] With the exception of the 49th

[100] Heather A. Conley, *Coast Guard Arctic Implementation Capabilities* (Washington, DC: Center for Strategic and International Studies, 2016), 2.

[101] US Army Corps of Engineers, *Alaska Deep-Draft Arctic Port System Study* (Alaska District: US Army, February 2015), 7.

[102] Francesco Femia, *Sea Level Rise and the U.S. Military's Mission* (Washington, DC: The Center for Climate and Security, February 2018), 42.

[103] United States Army, "U.S. Army Alaska," US Army Alaska, accessed February 25, 2018, http://WWW.army.mil/usarak.

Missile Defense Battalion, the remainder of USARAK assigned forces are under the operational control of USARPAC.[104] This command structure does not allow ALCOM tasking authority over US Army units during steady state operations in Alaska. ALCOM conducted a 2016 joint operation, christened Operation Chinook, to build interoperability between USCG, Canada Armed Forces, US Army, and US Army National Guard during a fictional scenario involving a stranded cruise ship.[105] During this exercise, ALCOM was able to provide mission command for all assigned forces, but during steady state operations, when an incident such as this is likely to occur, the majority of those forces are not under ALCOM's operational command. Nor is there a guarantee that US Army forces under USARAK will be available for operations in the Arctic because USARAK forces routinely support USARPAC operations in the Pacific theater. As demonstrated in Operation Chinook, ALCOM is capable of providing mission command of US Army forces when assigned. Unfortunately, the unspecialized nature of these forces creates additional challenges in extending the US Army's operational reach. Helping to train and develop capable Arctic ground forces, ALCOM as an extension of USNORTHCOM maintains the Northern Warfare Training Center (NWTC) and the cold weather research facility, both designed to build experience in cold weather operations across US Army formations.[106]

Extension of US Army's operational reach through logistics and organization are vital to Arctic operations, much more so than other military operations, as demonstrated by Exercise

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[104] US Department of Defense, *Resourcing the Arctic Strategy* (Washington, DC: Government Printing Office, 2016), 5–6.

[105] "Preparing for the Worst through Practice: Exercise Arctic Chinook 2016," *U.S. Northern Command*, 1, accessed December 22, 2017, http://www.northcom.mil/Newsroom/Article/927866/preparing-for-the-worst-through-practice-exercise-arctic-chinook-2016/.

[106] Northern Warfare Training Center (NWTC) which provides Cold Weather and Mountain Warfare training to US military and designated personnel, to enhance war-fighting capabilities of US and coalition partners; US Army, "Northern Warfare Training Center," w*ww.Army.Mil*, June 24, 2016, accessed November 8, 2017, https://www.army.mil/article/170432/northern_warfare_training_center; Robinson, *Statement of General Lori J. Robinson, United States Air Force Commander, Unites States Northern Command and North American Aerospace Defense Command*, 13.

Guerrier Nordique in 2016.[107] Meeting basic soldier requirements proved problematic. As an example, propane is used for standard field kitchens, but it does not operate below -32° Celsius. Furthermore, travel across tundras makes foot and mechanized movement difficult, and current US Army platforms do not operate well in such cold conditions. Similar to the Canadian experience during operation Hudson Sentential, the battle field geometry make overland resupply a complicated endeavor, elevating the requirement of aerial resupply. The extreme weather in the Arctic often precludes the use of air. Ground units must therefore be prepared for alternative means. Extreme conditions result in complications that US Army units are ill prepared to face, including inadequate navigational and communications equipment. Global positioning systems are not precise in the Arctic and can often be off by several degrees. Environmental conditions, including the Aurora Borealis, blocks high frequency radio systems, temporarily degrading communications equipment.[108] To prepare and mitigate these concerns, the US Army can draw a number of conclusions from Canada and Russia on large scale Arctic ground operations. Specifically, lessons on Arctic logistics, location of strategic infrastructure, and the creation of small organizations of highly trained and well-equipped soldiers.

The Canadians, during Operation Hudson Sentinel, were unable to use existing infrastructure or traditional methods of resupply to repair *Glace Bay*. They ultimately employed a specially trained Army unit to advance via ground with the repair parts to the shore nearest the stranded ship, establishing a temporary airfield from which to resupply. This is a prime example of the necessity of multi-domain operations in the Arctic. In 2016, joint exercise Arctic Chinook provided similar multi-domain options with the US Army Alaska National Guard flying in

[107] "Arctic Warriors: U.S. Soldiers Join Canadian Reservists for Exercise on Baffin Island," *www.Army.Mil*, accessed February 25, 2018, https://www.army.mil/article/122282/arctic_warriors_us_soldiers_join_canadian_reservists_for_exercise_on_baffin_island.

[108] Adam Lajeunesse and P. Whitney Lackenbauer, ed., *Canadian Arctic Operations, 1941-2015 Lessons Learned, Lost, and Relearned* (Fredericton: University of New Brunswick, 2017), 315.

support of USCG rescue operations after first establishing a ground base of operations. The entire exercise was sustained by the US Air Force, using prepackaged stocks developed at the cold weather research facility.[109] Both of these scenarios demanded a solution that could not be found in the traditional structure of the armed forces. As human activity in the Arctic multiples, these types of search and rescue operations will likely increase. By creating the necessary infrastructure, developing multi-domain framework for operations, and simplifying the ALCOM force allocation, the US Army will be able to fill the gaps identified in the DoD 2016 *Resourcing the Arctic*.

The DoD concludes in its 2016 report, *Resourcing the Arctic,* that substantial significant uncertainty still exists in terms of climate change and increased human activity in the Arctic. DoD maintains that such difficultly to anticipate creates a challenge in balancing the risk of being too late and the cost of making premature investments.[110] Figure 3.1 illustrates that the DoD Arctic Strategy is nested with the 2013 NSAR and is meeting its two objectives of "ensuring security" and "prepare to respond." In respect to security, the US Army maintains missile defense units at three installations under the operational control of ALCOM and NORAD. In meeting maritime security, the US Navy and USCG have both developed Arctic strategies or glide paths in 2014 respectively to meet the NSAR.[111] However, the US Navy and USCG do not have a deep-water port close enough to the Arctic for sustained operations or to support extensive search and rescue or disaster response. Additionally, the absence of necessary infrastructure prevents DoD and the USCG in fully meeting the intent of the Arctic council's search and rescue pact.[112] Russia and

[109] Lori J. Robinson, *Statement of General Lori J. Robinson, United States Air Force Commander, Unites States Northern Command and North American Aerospace Defense Command* (Washington, DC: Government Printing Office, 2017), 1.

[110] US Department of Defense, *Resourcing the Arctic Strategy*, 8.

[111] Department of the Navy, *The United States Navy Arctic Roadmap for 2014 to 2030*; Department of Homeland Security, *United States Coast Guard Arctic Strategy*, 14.

[112] Department of Homeland Security, *United States Coast Guard Arctic Strategy*.

Canada have solved this dilemma through an increase in infrastructure construction and the activation of specialized ground units. Russia has focused on infrastructure while Canada has emphasized multi-domain flexibility. In respect to the DoD's second objective of "prepare to respond," the US Army maintains sufficient strength in the Arctic region to respond to a variety of contingency operations should the command authorities between USARAK and ALCOM be resolved.

The US Army does not have any specified or essential tasks outlined in the 2016 DoD strategy for the Arctic. Nor is there any specified requirement from ALCOM to the US Army besides ballistic missile defense. The analysis of current US policy suggests that the US Army maintains the correct capabilities to meet the objectives and goals assigned to it Arctic policy. However, the US Army may be able to provide a multi-domain capability in the Arctic to the other DoD elements charged with providing resource protection, freedom of navigation, and protection of sovereignty. It is through an understanding of how other Arctic nations, such as Russia and Canada, responded to similar constraints that the US Army can become a force multiplier. Current limitations in the availability of a deep-water port was overcome in Canada by the standing up of specialized Army units capable of traveling overland to provide the necessary support to Canadian ships operating in the Arctic. The creation of specialized units, either in the active army or reserves, could provide DoD with similar effects. The Russian activation of a joint Arctic command enabled a unified command structure for all assigned units within a certain operations area. Conceivably, this unity of effort will allow Russia to employ all domains in the Arctic. Redefining the support relationship between USARAK and ALCOM could provide similar benefits. Finally, the US Army can benefit from all the Arctic nations in their dedication and experience for logistical operations in the Arctic.

Arctic Warriors — Findings and Conclusion

The US Army is postured and resourced to provide ways and means to support its essential tasks as outlined in the US National and DoD Arctic policy objectives. The US Arctic

policy insists that the probability for conventional warfare in the Arctic is limited and unlikely. While the possibility for large conventional warfare is remote, the increasingly accessible Arctic, due to the melting of sea ice, will increase human activity. Increased human activity will require additional unilateral, bilateral, and multilateral actions to address stakeholder concerns over sovereignty, resource extraction, and improved access to SLOCs. Among the Arctic nations, the United States maintains three national security interests: strategic deterrence, maritime security, and freedom of navigation. Of these three strategic ends, the US DoD provides several means with focused missions for the US Navy in freedom of navigation and maritime security. The USCG indirectly supports the 2016 strategy by providing maritime security for the Arctic through commitment to the Arctic Coast Guard Forum for search and rescue. Finally, USNORTHCOM and NORAD, with assigned elements of the US Air Force and US Army, provide the preponderance of military forces operating in the Arctic and are focused on strategic deterrence and early warning.[113] In this complicated operating environment, the number of US military stake holders and the convoluted command and control structure are complex. In order to achieve the unity of effort that Russia's Arctic Strategic command enjoys, the US DoD must streamline the existing Arctic command structure.

The complicated command structure in the Arctic, which includes geographic combatant commands, generates tensions in how each command responds to the actions of other Arctic stake holders, as reveled in figure 3.2. The 2011 UCP sought to mitigate those tensions by aligning the Arctic itself under USNORTHCOM, but the majority of units assigned to ALCOM and NORAD are oriented towards threats outside of USNORTHCOM's area of responsibility. This bifurcation is manageable as the 2011 UCP assigned USNORTHCOM with the sections of the Arctic Ocean that the United States is responsible for under the Arctic Council's search and rescue agreement. This allows ALCOM to employ all military domains within their area of responsibility. However,

[113] US Department of Defense, *Arctic Strategy*.

the majority of ground forces in Alaska belong to USARAK and are unavailable should ALCOM encounter a problem similar to the one identified by Canada during Operation Hudson Sentential. The allocation of specialized Arctic ground units under the ALCOM's umbrella of responsibility would provide additional options should ALCOM face a similar situation. During ALCOM's joint exercise, Operation Chinook, the Alaska Army National Guard fulfilled this role, but with climate change and its effects on infrastructure, a more responsive force may be necessary.

Insufficient infrastructure and an inability to accurately forecast the wide-ranging effects of climate change hamper the United States' implementation of a comprehensive Arctic strategy. Melting permafrost rates will make permanent infrastructure, including roads and coastal facilities, difficult to maintain. Structures built on permafrost will be difficult to maintain once the permafrost melts. In order to overcome these obstacles, the United States can look to Canada and Russia for innovative military designs. The US Army can assist in overcoming the infrastructure limitations in maritime security and freedom of navigation though blending capabilities with the US Navy and USCG in a fashion similar to the Canadian ARCG. To maintain this critical infrastructure, the Canadians have come to rely on their Ranger program and ARCG reserve units, which are capable of resupplying these outposts via overland ground operations. The US Army has begun to increase its ability to operate in the Arctic with the 2016 Exercise Guerrier Nordique, which also identifies significant problems with existing US Army Arctic logistics and equipment.

All military operations in the Arctic are defined by the extension of operational reach through logistics. Extreme environmental conditions impact Arctic operations and soldiers find themselves spending vast amounts of time and resources just on survival. Recent joint operations with Canada continue to reinforce that small, well-trained units are far superior to large untrained

organizations.[114] As the United States seeks to implement its Arctic strategy and treaty obligations, a heighten commitment to logistics will be vital in ensuring mission success. The US Army should conduct further research on how to build and maintain a cadre of soldiers and leaders who can operate in extreme cold weather conditions. Through understanding the strategic context and analyzing how other Arctic nations have adopted and responded to Arctic climate change, the US Army can provide additional capabilities to fulfill US DoD Arctic Strategy.

[114] Lajeunesse and Lackenbauer, *Canadian Arctic Operations, 1941-2015 Lessons Learned, Lost, and Relearned*.

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