REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
01-05-2017	Research	Present to 2025

4. TITLE AND SUBTITLE
A Cold, Hard Fight:

The Marine Corps Can be a Force Multiplier in the Alaskan Arctic

5a. CONTRACT NUMBER
N/A

5b. GRANT NUMBER
N/A

5c. PROGRAM ELEMENT NUMBER
N/A

6. AUTHOR(S)
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5d. PROJECT NUMBER
N/A

5e. TASK NUMBER
N/A

5f. WORK UNIT NUMBER
N/A

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
USMC School of Advanced Warfighting
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2044 South Street
Quantico, VA 22134-5068

8. PERFORMING ORGANIZATION REPORT NUMBER
N/A

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
N/A

10. SPONSOR/MONITOR'S ACRONYM(S)
N/A

11. SPONSORING/MONITORING AGENCY REPORT NUMBER
N/A

12. DISTRIBUTION AVAILABILITY STATEMENT
Unlimited

13. SUPPLEMENTARY NOTES
N/A

14. ABSTRACT
In the coming decade, the Arctic is likely to become a more contested area as climate change increases navigatability of the sea lines and as a resurgent Russia continues to develop its military infrastructure and forces in the Arctic. As a versatile and expeditionary forces the Marine Corps can provide a valuable contribution to the Joint fight in the Alaskan Arctic as both a sea-based and land-based force. The Marine Corps with its unique warfighting capabilities, can integrate with the existing Alaskan Command (ALCOM) structure to contribute to the Joint fight in this challenging theater; three employment models of Marine forces provide the Joint Force Commander (JFC) scalable and responsive options across the range of military operations (ROMO) for the Alaskan Theater.

15. SUBJECT TERMS
Arctic, Marine Corps, Alaska Command, Joint Forces

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE	UU	31	Marine Corps University / School of Advanced Warfighting
Unclassified	Unclassified	Unclassified			19b. TELEPONE NUMBER *(Include area code)* (703) 432-5318 (Admin Office)

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Future War Paper

Title:

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SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF OPERATIONAL STUDIES

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Date: 8 MAY 2017

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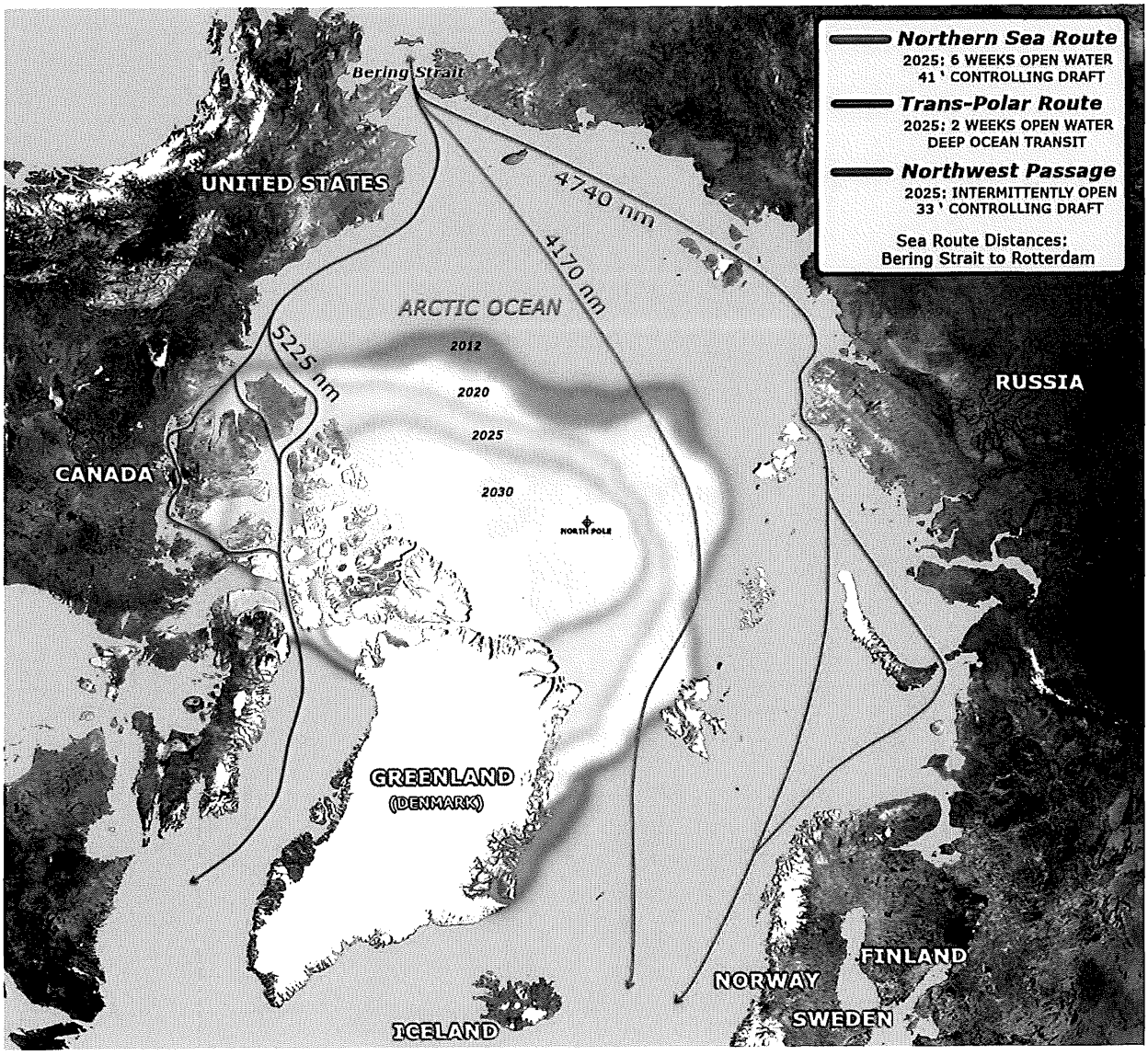
Introduction

Brigadier General Billy Mitchell once referred to Alaska as "the most strategic place on earth."[1] Alaska and its significant amount of Arctic territory is a challenging and complex area of the world whose importance will only grow in the coming decade. Geographical changes resulting from climate change will make the region, with its vast natural reserves and strategic shipping lanes, geopolitically more important and potentially more contested.[2] Across the Bering Strait, a resurgent Russia continues to develop its military capability and posture its forces in the Russian Arctic. As the Marine Corps studies and defines future operating concepts, it should consider the Alaskan Arctic as a possible area of operations. *The Marine Corps with its unique warfighting capabilities, can integrate with the existing Alaskan Command (ALCOM) structure to contribute to the Joint fight in this challenging theater; three employment models of Marine forces provide the Joint Force Commander (JFC) scalable and responsive options across the range of military operations (ROMO) for the Alaskan Theater.*

Arctic Overview and Strategic Context

The Arctic environment is challenging because of its extremely cold, harsh climate; its vast sea and land space; and its limited infrastructure. The region's economic value currently centers on its natural resources, such as oil and natural gas, with an estimated 22 percent of the world's supply lying undiscovered below the land and water of the Arctic.[3] As climate change reduces the ice shelf, the Arctic waters are becoming more navigable and increasingly viable as strategic shipping lanes. Two sea routes, the Northern Sea Route and the Northwest Passage, are open for shipping for portions of the year. A third route, the Trans-Polar Route, is expected to become a viable shipping route in 2025 (see Map 1).



Map 1: The Arctic Sea Routes

The Bering Strait will likely become a critical strategic chokepoint in the coming decades.[4] Figure 1, from the US Navy Arctic Road map, illustrates the projected enhanced shipping access along these routes.[5] By 2030, all three sea routes will be open for at least five weeks of the year.

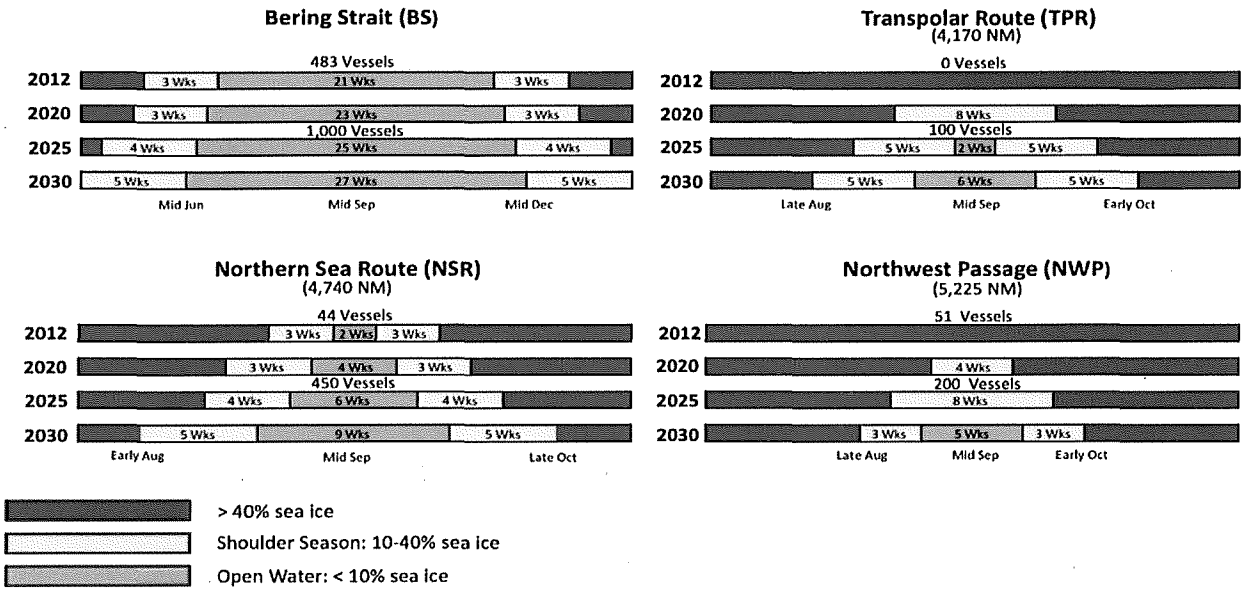


Figure 1: Arctic Sea Route Navigability

The Arctic has been a contested region in the past. During the Cold War it was heavily militarized, with both Russia and the United States dedicating significant forces to Arctic operations.[6] Russia has considerable economic, political, and security interests in the Arctic. Approximately one-fifth of the Russian landmass is north of the Arctic Circle.[7] Additionally, "the region provides 20 percent of Russia's gross domestic product and 22 percent of its exports, primarily energy and minerals…The region is also home to 2 million Russians."[8] Russia has advanced several territorial claims to disputed or unclaimed areas of the Arctic, including the vast underwater Lomonosov Ridge.[9] The Northern Sea Route passes almost exclusively through Russian waters. Recently, Russia has devoted considerable resources to building or upgrading Arctic bases and forces as part of a long-term plan that includes adding six new military bases and opening "10 Arctic search-and-rescue stations, 16 deep-water ports, 13 airfields, and 10 air-defense radar stations across its Arctic periphery."[10]

The United States has recognized the growing importance of the Arctic and published several national policy and strategy documents on the subject, including a national security strategy document and a national defense strategy document. In the 2013 *National Strategy for the Arctic Region*, President Obama defined the end state as "an Arctic region that is stable and free of conflict, where nations act responsibly in a spirit of trust and cooperation, and where economic and energy resources are developed in a sustainable manner that also respects the fragile environment and the interests and cultures of indigenous peoples."[11] In addition to these two documents, the Navy published the *U.S. Navy Arctic Roadmap 2014-2030*, an update from the original 2009 document.

These documents currently assess the Arctic as a low-threat environment; however, the United States recognizes that as the Arctic becomes more accessible in the future and its economic importance grows, the potential for disagreement and conflict increases. Thus, the United States' approach toward the Arctic is one of active engagement with partners and allies to cooperate and peacefully resolve issues. The United States also understands the need to remain engaged in the region politically and militarily to ensure national interests, exercise sovereignty, and promote international cooperation. These interests and efforts are prioritized against competing United States national interests across the globe, yet the challenging operating environment of the Arctic requires deliberate planning and preparation to operate successfully there both now and in the future. Efficient, effective, and creative employment of the Joint force will be imperative in future Arctic operations because the theater may encompass an economy of force and supporting efforts balanced across a multitude of global threats.

The *U.S. Navy Arctic Roadmap* makes no mention of the Marine Corps as an element of its naval force nor does ALCOM currently include Marine forces; however, Marine Corps

capabilities can readily assist the Navy in its Arctic strategic objectives and can be valuable assets in ALCOM's Joint fight.

Alaskan Command

The American Arctic region is overseen by Alaskan Command, a sub-unified command subordinate to Northern Command. ALCOM is a unique and complex command. (see Figure 2)

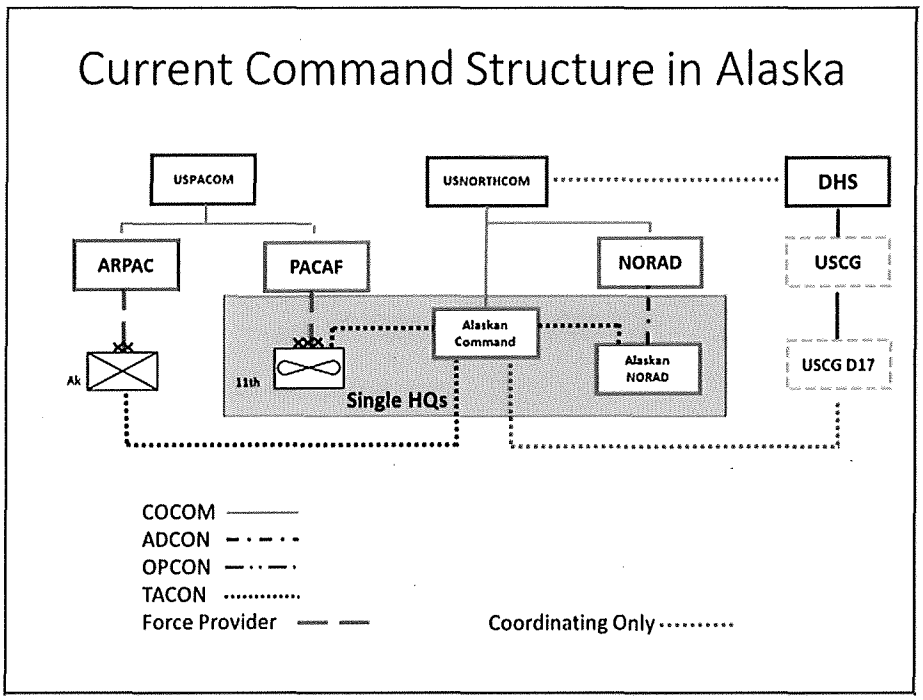


Figure 2: Current Command Structure in Alaska

There are three major commands within the Alaskan theater: ALCOM, US Army Alaska, and US Coast Guard District 17. In addition to being a joint sub-unified command, ALCOM also functions as Eleventh Air Force and Alaskan North American Aerospace Defense Command (NORAD)[12] Region headquarters. ALCOM's primary focus is to facilitate readiness, plan and execute Defense in Support of Civil Authorities (DSCA) missions, and identify Arctic capabilities shortfalls. As Alaskan NORAD region, it is responsible to maintain aerospace control and defense of its area of operations. As Eleventh Air Force, it is mainly a force provider

composed of two active duty wings, one of which is solely responsible for supporting Exercise RED FLAG ALASKA and contains no offensive air capability; two Air National Guard (ANG) wings augment Eleventh Air Force and provide refueling, combat search and rescue, and combat support.[13] (see Figure 3)

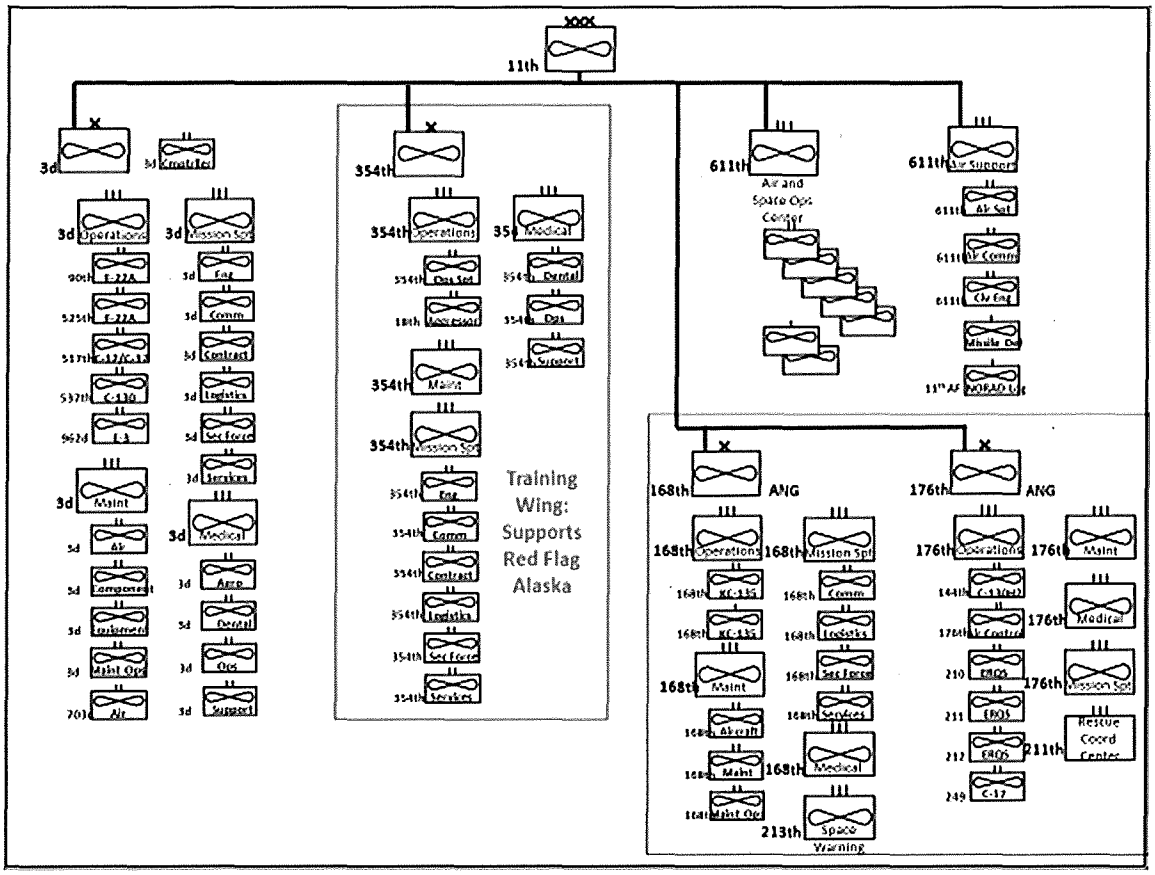


Figure 3: Eleventh Airforce Organization

US Army Alaska consists of two maneuver units and support units. US Army Alaska's primary mission is as a force provider and reports to United States Army Pacific (USARPAC). Its secondary mission is to "support theater engagement in the Pacific/Arctic and military operations in the [Alaskan Joint Operating Area] AK-JOA."[14] The two maneuver units within US Army Alaska are a Stryker brigade combat team and an airborne infantry brigade combat team. (see Figure 4)

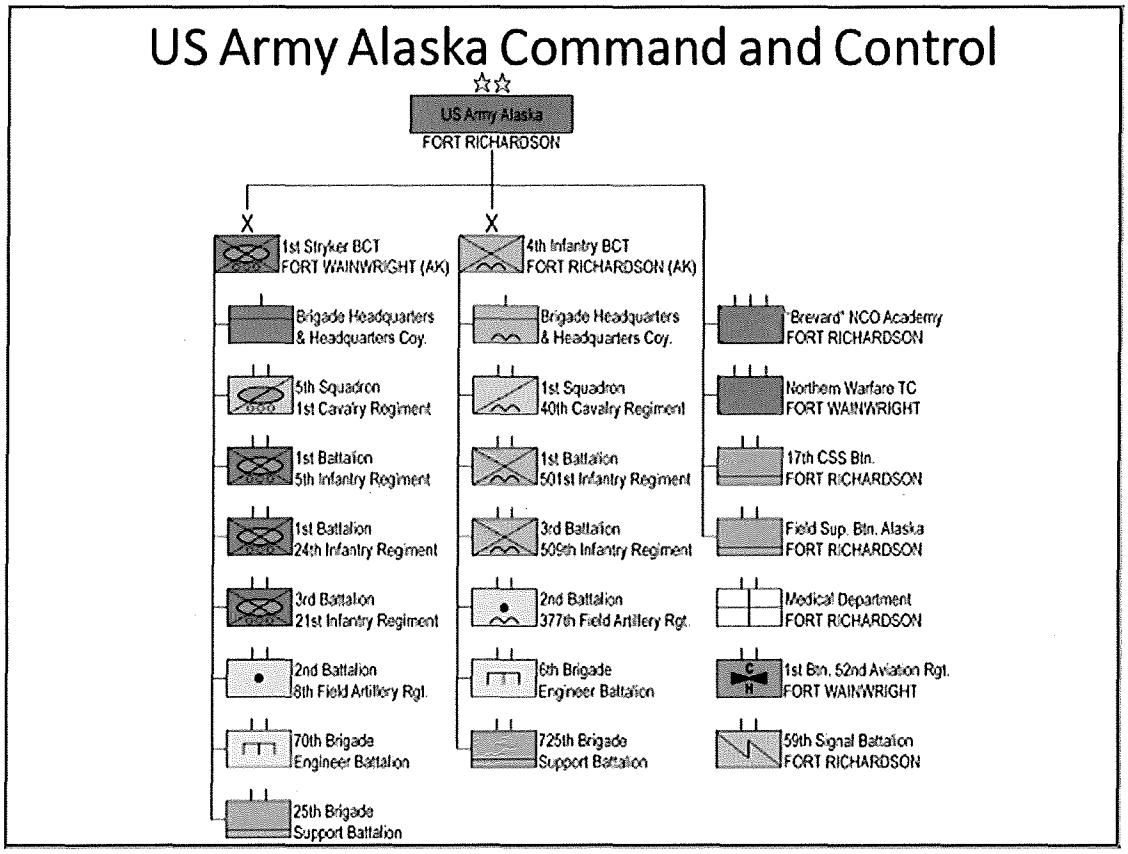


Figure 4: US Army Alaska Organization

United States Coast Guard District (USCG) 17 executes missions in support of Homeland Defense, DSCA and search and rescue (SAR). USCG District 17 cooperates with the Canadian military and Coast Guard in its SAR mission and works to support freedom of navigation missions when one of the USCG ice breakers is attached to the district.[15] ALCOM does not currently have any plans to integrate naval forces into the defense of Alaska, or for power projection or deterrence operations in the Alaskan Theater.

ALCOM is unique in that it has several DoD and interagency partners, such as the National Guard, the Alaskan Air National Guard and the Alaskan Naval Militia[16]. Since the Alaskan theater is US territory, ALCOM has Homeland Defense and Civil Support missions in addition to traditional military missions. This complex command structure, with many command relationships, presents interoperability challenges and opportunities. The current ALCOM

structure has limited ability to conduct major offensive operations; however, it provides an initial structure to evolve as a Joint Task Force (JTF) if it is augmented by other elements of the Joint force to conduct expanded operations. Marine forces training and operating in Alaska would provide excellent opportunities for ALCOM to learn Marine capabilities and enhance interoperability for potential JTF missions.

The Solution

As a scalable, deployable, and expeditionary force able to tailor units to specific missions, the Marine Corps can present numerous force packages with a variety of relevant capabilities to enhance both the naval and the Joint force in Alaskan Arctic operations. The extensive Alaskan coastline and limited infrastructure ashore make the amphibious and expeditionary nature of the Marine Corps an attractive option to extend the Joint Force's operational reach. Operating from the sea as part of the Navy-Marine Corps team or as a shore-based Marine Air-Ground Task Force (MAGTF) Marine forces can conduct operations, ranging from conducting partner and joint interoperability training in a permissive environment to raids or forcible entry operations in a hostile environment, which would demonstrate the United States power projection capability while enhancing its deterrence and sea control. The MAGTF maneuverability[17] becomes a force multiplier for the combatant commander by enhancing employment opportunities across the battlespace. This maneuverability makes United States actions less predictable to the enemy, forcing him to guard against multiple possibilities.

To operate in the Arctic environment effectively the Marine Corps can provide task organized MAGTF options able to meet the significant logistical and manning requirements necessary to support extreme cold weather operations. The Marine Corps can also offer creative

solutions outside the traditional MAGTF constructs that use elements of the MAGTF in new ways to meet the future operating environment. Applying distributed operations or alternate shipping platform concepts, the Marine Corps can partner with and leverage Interagency capabilities such as the Coast Guard or Border Patrol to exercise sovereignty and provide deterrence.[18]

Three models of employment of Marine forces in the Alaskan theater offer different opportunities to consider how Marine forces might support ALCOM operations. The first model is one of traditional Marine training and exercise during "Phase 0" operations, which could provide a foundation of knowledge for both the Marine Corps and ALCOM to guide scalable, tailored MAGTFs in future crisis and contingency response operations across the ROMO. [19] The second model demonstrates how the Marine Corps can be employed as part of a naval force, either on traditional amphibious ships or on alternative shipping such as Coast Guard vessels. A third model advances current shore-based Special Purpose MAGTFs (SPMAGTFs) into a non-traditional, task-organized "flying column" that takes advantage of Marine competencies as a self-sustaining, light-infantry-centric force able to conduct long-range operations in the austere Arctic environment with dedicated aviation support. [20]

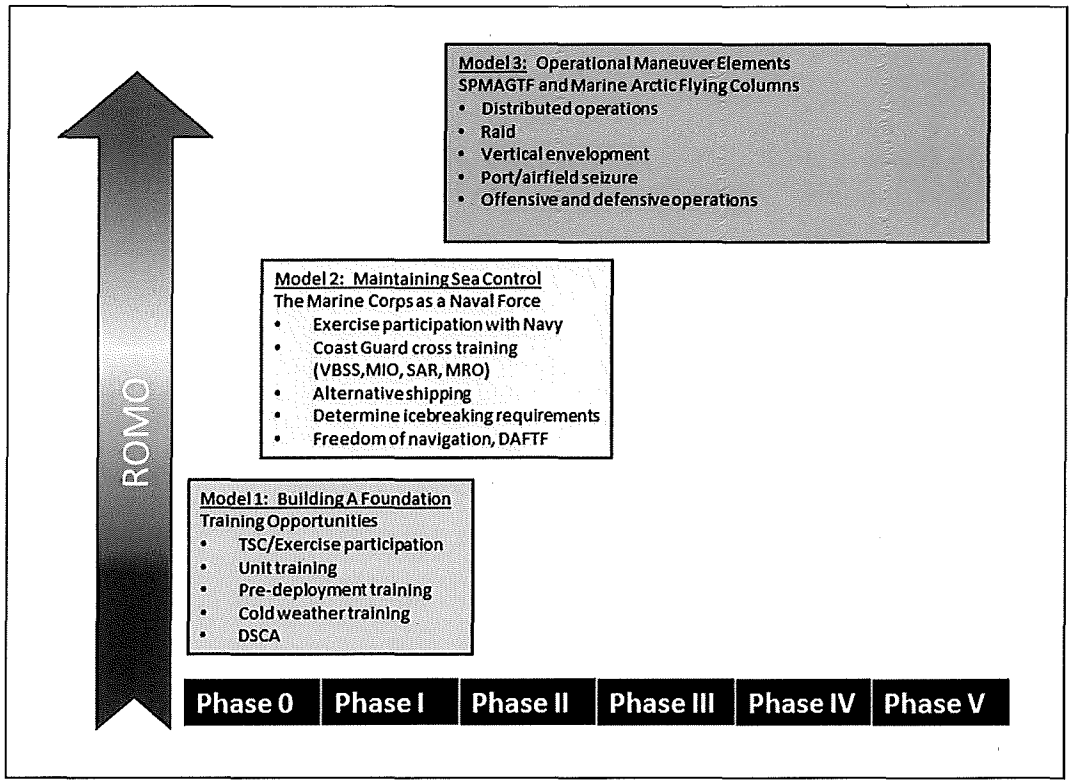


Figure 5: Marine Force Models

Model 1: Building a Foundation: Alaskan "Phase 0" Training Opportunities

The Marine Corps executes different training exercises and operations within the United States and across the globe during "Phase 0" operations. These endeavors provide valuable training and rehearsals opportunities for Marine units and higher headquarters staffs. Theater security cooperation and bilateral exercises also bolster partnerships with other nations and their militaries while demonstrating the credibility of Marine expeditionary capabilities, which may act as a deterrent to potential adversaries. Examples of such exercises include the Marine Rotational Force-Darwin (MRF-D) in Australia, the Unit Deployment Program (UDP) in Okinawa, and the Marine Expeditionary Units (MEUs). Similar opportunities and benefits may exist in Alaska for the Marine Corps and ALCOM, but it may be more cost effective and easier to coordinate because the venues are within the United States.

The Marine Corps can send forces to conduct training in Alaska that take advantage of

Alaska's extensive land, sea, and air training areas and live fire ranges.[21] The Joint Pacific Alaska Range Complex (JPARC) hosts multiple major training exercises each year and is capable of brigade-level training.[22] Alaskan training would sharpen Marines' combat skills, enhance their ability to operate in a cold weather climate, enable Marines to assess the capability and adequacy of Alaskan infrastructure to support real world operations, and build relationships between the Marine Corps and ALCOM.

Conducting unit training or participating in large-scale exercises in Alaska would enhance the readiness and proficiency of Marine forces while improving interoperability with Joint, Interagency, or coalition partners. These exercises also could be an important low-level deterrence activity designed to signal to American adversaries and allies its willingness and competence to conduct Arctic operations. The Marine Corps should engage with ALCOM during the global force management (GFM) process to determine what scheduled exercises would be appropriate to support with each force package and align the training and exercise evaluation plan (TEEP) to assign available units to participate in these exercises. Alaska may provide worthwhile venues to conduct pre-deployment training (PTP) for MEUs or SPMAGTFs, unit training as an alternate to 29 Palms or Yuma, reserve unit annual training (AT), or major amphibious exercises such as BOLD ALLIGATOR or DAWN BLITZ. For example, a West Coast MEU in its PTP cycle and its associated Amphibious Ready Group (ARG) could participate as part of the naval forces in Exercise NORTHERN EDGE or a reserve unit could conduct cold weather and maneuver training at JPARC for its AT.[23]

Model 2: Maintaining Sea Control in Alaska: The Marine Corps as a Naval Force

The Alaskan Arctic has significant key terrain and viable ports within the littorals. In

addition to the strategic chokepoint of the Bering Strait, other littoral areas[24] could enable power projection and sea control for United States forces operating in the Alaskan Arctic, but may also be vulnerable to adversary actions. The limited road and rail network make the sea and air key modes of transportation. Thus, the Marine Corps' ability to operate from the sea would provide increased maneuverability and power projection options for ALCOM. As part of the Navy-Marine Corps teams, embarked Marines can conduct traditional training and operations aboard amphibious shipping.[25] NORTHERN EDGE, a major biennial exercise, includes Joint air, sea, and land training, in which the US Navy regularly participates.[26] This exercise is an excellent opportunity for the Navy-Marine Corps team to conduct amphibious training with a MAGTF embarked on amphibious shipping. Navy-Marines training in an Arctic environment would also help to determine the icebreaking requirement needed to support amphibious operations north of the 60-degree latitude line for an ARG or Expeditionary Strike Group (ESG).[27]

Limited amphibious shipping has also driven the Marine Corps to examine alternative shipping platforms to conduct amphibious operations. The Alaskan theater provides ample opportunities to continue this experimentation, with the Coast Guard or other vessels. Coast Guard District 17, responsible for Alaska and partnered with ALCOM, remains actively engaged in maritime Alaska. Its supports Department of Homeland Security (DHS) missions of preventing terrorism and enhancing security, securing and managing borders, and strengthening national preparedness and resiliency.[28] Operating throughout Alaskan waters, the Coast Guard provides several opportunities to conduct interoperability training, such as embarking Marines on Coast Guard vessels, working with Marine aviation to conduct external lift and fast-roping operations, or assessing the feasibility of landing rotary wing or unmanned aircraft.[29] Marines could conduct cross-training with the Coast Guard in visit, board, search, and seizure (VBSS)

and maritime interdiction operations (MIO). As part of ALCOM's DSCA mission, Marines could assist in training or executing search and rescue (SAR), mass rescue operations (MRO), and other contingency response operations the Coast Guard executes.

Model 3: Operational Maneuver Elements: "Marine Arctic Flying Columns"

The third model is an operational maneuver element designed to operate at the high end of the ROMO, potentially as an economy of force measure in the Alaskan Arctic as a supporting effort in a major international conflict. This version of a shore-based SPMAGTF could be task-organized with subordinate "Marine Arctic Flying Columns" (MAFC) designed to conduct distributed operations across a large area. The threat of Russian massed fires[30], combined with the vast space of the Arctic, makes the decentralization of the United States forces important. The MAFC model originates from the CHINDIT concept employed in Burma during World War II. While the CHINDITS fought in thick jungles, the value of light infantry maneuver units able to operate independently, to be supplied primarily by air, and to conduct long-range distributed operations applies to the Alaskan Arctic as well. These MAFCs could conduct distributed operations in a harsh environment against an enemy who has demonstrated an ability to mass fires quickly and efficiently.

Creating company reinforced flying columns, capable of operating independently with associated aviation combat element (ACE) and logistics combat element (LCE) support, builds on the company landing team concept and applies it to the Arctic environment. (see Figure 6)

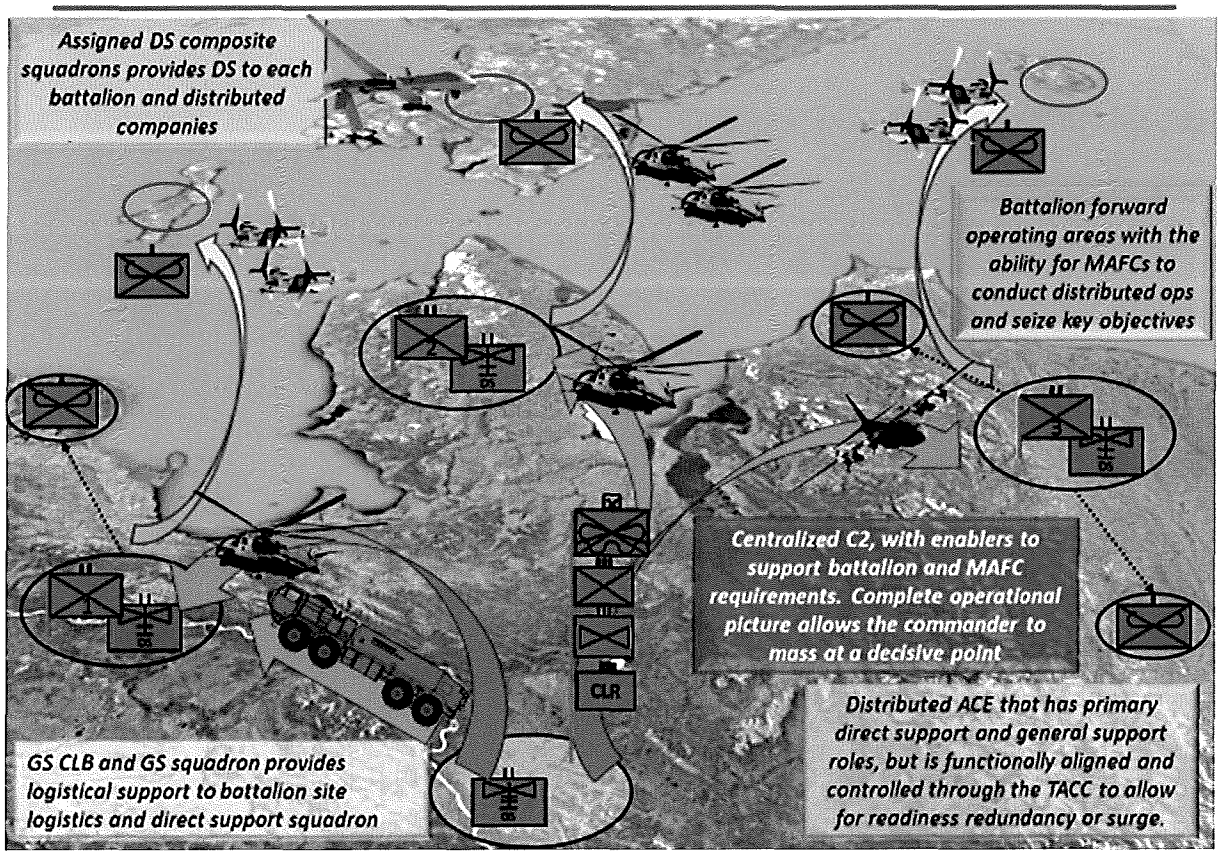


Figure 6: Model 3: Shore based distributed SPMAGTF concept of operations

Able to operate independently, these MAFCs could mutually support one another and mass quickly to project combat power at a decisive point. The ground combat element (GCE) would employ a hub and spoke structure to support the distributed operations. Normal C2 structures at the battalion level and above would remain in place to retain span of control. (see Figure 7) The ACE would be task organized into four composite squadrons with the addition of one C-130 fixed wing squadron. One composite squadron would be in general support of the SPMAGTF and provide most of the logistical maneuver for the MAFCs with a heavy lift core squadron. Three of the composite squadrons would be distributed and provide direct support to each of the battalions and its three MAFCs with fires and assault support capabilities. Although distributed, the ACE would be functionally aligned through the aviation command and control

system to offer surge and redundancy capability, allowing the commander to distribute assets evenly or weight them according to effort or area as the mission dictates. Logistics support to the MAFCs would mainly be supported by air, allowing the distributed units to travel lighter and faster. The LCE would provide all tactical logistics functions to the hub locations to support the battalions and direct support ACE squadrons. The ACE squadrons would include a Marine wing service support (MWSS) detachment to provide aviation ground support (AGS) to the airfields.

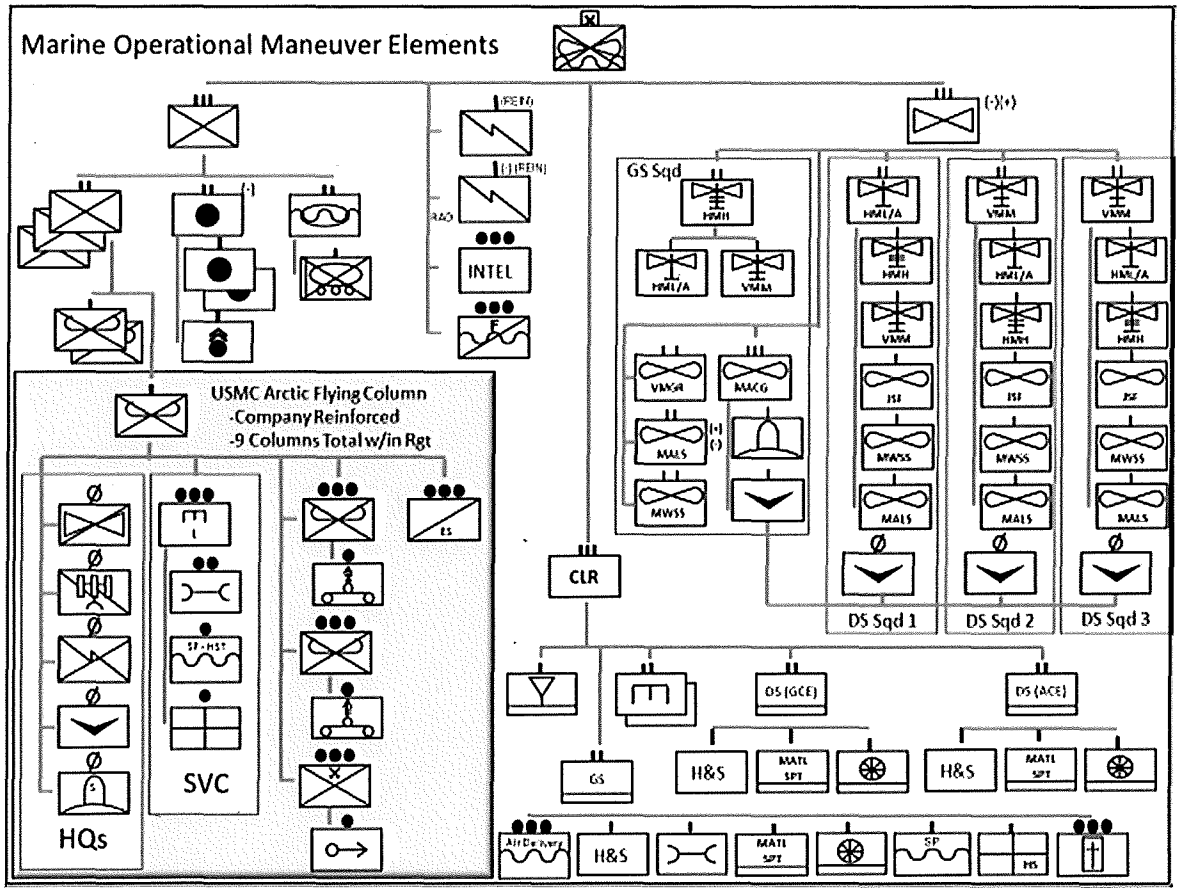


Figure 7: Marine Operational Maneuver Elements Proposed Structure

Current SPMAGTFs deployed in Central and European Commands demonstrate utility in the responsiveness of a shore-based MAGTF; however, this employment models also come with some challenges. Host-nation caveats on basing and overflight rights can limit the force structure or operational flexibility of the SPMAGTF. As a versatile and responsive, yet small

forces, SPMAGTFs must determine command and support relationships within the Joint Force to receive both operational direction and sustainment.[31] Operating in Alaska could mitigate some of these challenges for a SPMAGTF. It would be based in and operating from sovereign United States territory, alleviating host nation basing or overflight issues. ALCOM, as a sub-unified command, provides a nucleus for a Joint Task Force under which SPMAGTF could operate and the existing military infrastructure, units, and sustainment activities could readily support the SPMAGTF.

Challenges, Opportunities, and Recommendations

The Marine Corps has the potential to bring significant value to Joint operations in the Alaskan Arctic as the region becomes more important strategically in the coming decade and ALCOM's existing structure provides a workable framework on which to build a Joint task force capable of employing forces across the ROMO. Near term challenges should be addressed to posture the Marine Corps and the Joint force for future success in the Alaskan Arctic. As the Alaskan Arctic grows in importance over the next ten years, the complexity of the threat will evolve, and so should the United States' response to it.

As the Marine Corps and ALCOM examine future operations in the Alaskan Arctic that involve Marine forces, it is important for both organizations to build relationships and common understanding that will enhance operational effectiveness and command and control. The Marine Corps should staff the two vacant Marine billets in ALCOM to provide subject matter expertise on Marine capabilities that can assist ALCOM in accomplishing its missions. The Marine Corps should seek opportunities to conduct unit training, including as participants in major exercises, at Alaska's numerous training areas and live-fire ranges. The Navy, along with

the Marine Corps, should seek to conduct naval and amphibious training in Alaska. Additional opportunities exist for Marine forces to participate in current ALCOM operations, such as cross-training with the Coast Guard and experimenting with Coast Guard vessels as alternative shipping platforms. These steps will build relationships and enhance interoperability now to help seamlessly execute future Joint operations.

The Marine Corps should examine the unique demands of an extreme cold weather environment and take steps now to prepare for operations in such a theater. Over the past fifteen years the US military largely has focused on desert operations. There has been little attention on training in an extreme cold weather environment, apart from Mountain Warfare Training Center courses in Bridgeport, California. The most recent cold weather exercise for the Marine Corps, COLD RESPONSE 16 in Norway, was the largest exercise of this type since the late nineties and provided useful lessons relevant to the Alaskan Arctic. Establishing an equipment pool for Joint or Marine forces in Alaska to support both training and real world operations would greatly enhance Marine responsiveness in the Alaskan theater.

Conclusion

As climate change causes the ice shelf to recede, the accessibility and economic potential of the Arctic will increase. The increased value of the Arctic coincides with a resurgent Russia intent on capitalizing on the economic opportunities in the Arctic while flexing its growing military muscle. United States national security policy has identified the importance of the Arctic and wants it to remain "stable and conflict-free" while sustaining global freedom of navigation and United States sovereignty. ALCOM currently supports a variety of training and operational missions, providing an existing structure for Joint Force operations to be augmented

and enhanced with Marine formations to meet larger forces and higher end operations.

The unique capabilities of the MAGTF can be leveraged by the Joint force across the ROMO in the Alaskan Arctic operating environment. The Marine Corps can augment the Navy and Coast Guard to establish sea control and power projection, both as a deterrent force and in execution of contingency operations. Developing three MAGTF models, the Marine Corps could provide the Joint Force Commander capable and responsive solutions to a variety of scenarios across the ROMO. The Marine Corps' expeditionary nature and naval character readily lend itself to both sea and land based operations in the vast, austere Alaskan Arctic and its limited infrastructure.

To achieve this capability, significant challenges must be addressed by the Marine Corps, ALCOM, and the Department of Defense to meet the future demands of major operations in the Alaskan Arctic theater. Taking steps now to address these challenges will enable the United States to effectively confront any future threats in the Arctic. The Department of Defense should assess, identify, and source its icebreaker capability to support future strategic aims, including the ability to conduct amphibious operations in the Alaskan theater. The Marine Corps should seek to participate in Alaskan unit training or exercise opportunities both on land and at sea with the Navy, explore Coast Guard vessels as alternative shipping, and develop the MAFC concept. Dedicated to fighting and winning in "any clime and place" the Marine Corps can take steps now to prepare and plan for excelling in the harsh Arctic environment and providing the Joint Force Commander a game-changing capability.

[1] Brigadier General Billy Mitchell, Testimony to Congress 1935, cited in ALCOM capabilities brief, 23 July 2016, slide 5.
[2] Covering three continents, the Arctic region includes the territory of the United States (Alaska), Canada, Russia, Denmark (Greenland), Iceland, Finland, Sweden, and Norway (see *About Education*, "A Geography and Overview of Earth's Arctic Region," http://geography.about.com/od/globalproblemsandissues/a/arcticregion.htm, accessed 8 November 2016.
[3] LtCol Todd Manyx, SIG Scouting Report for the week of 25 Jan 2016, 1.
[4] A Strategic Initiative Group (SIG) Scouting report from January 2016 states, "the Polar routes are expected to offer savings for routes between Northern Europe and the Northern Asia ports that are 24 percent shorter compared to the Strait of Malacca and the Suez Canal transit...estimated significant financial savings will include up to $600,000 per ship, per direction with annual savings of approximately $60-$120 billion."
[5] *USN Arctic Roadmap*, 11.
[6] From 1918-1920, the United States deployed forces to Russia during the Bolshevik Revolution. The American Expeditionary Force-Siberia consisted of 8,000 soldiers that landed in Vladivostok and conducted operations for 19 months and the Polar Bear Expedition consisted of 5,000 soldiers that landed in Archangel and conducted operations for 9 months. This event has largely been forgotten by the United States but remains foremost in the minds of Russians, making their concerns about protecting Russian sovereignty in the Arctic not unfounded. During World War II, the Japanese seized the Aleutian Islands of Attu and Kiska in June 1942 and the Allies fought a bloody battle to retake the islands in May 1943. See Gibson Bell Smith, "Guarding the Railroad, Taming the Cossacks: the US Army in Russia, 1918-1920," *Prologue* Winter 2002, Vol. 34, No. 4 https://www.archives.gov/publications/prologue/2002/winter/us-army-in-russia-1.html and Center for Military History, *Aleutian Islands: The US Army Campaigns of World War II. CMH Pub 72-6*, http://www.history.army.mil/brochures/aleut/aleut.htm.
[7] *Wikipedia*, "Arctic Policy of Russia," accessed 8 November2016, https://en.wikipedia.org/wiki/Arctic_policy_of_Russia.
[8] Grady, "Report: New Forum Needed to Negotiate Arctic Security Concerns."
[9] Congressional Report on Changes in the Arctic, 20 February 2014, 2.
[10] Jeremy Bender, "Russia Just Put the Finishing Touches on 6 Arctic Military Bases," *Business Insider*, 7 December 2015, http://www.businessinsider.com/russia-equipped-six-military-bases-in-the-arctic-2015-12.
[11] The White House, *The National Strategy for the Arctic Region* (Washington, DC, May 2013), https://www.whitehouse.gov/sites/default/files/docs/nat_arctic_strategy.pdf. 4.
[12] The North American Aerospace Defense Command (NORAD) is a United States and Canada bi-national organization charged with the missions of aerospace warning and aerospace control for North America. Aerospace warning includes the detection, validation, and warning of attack against North America whether by aircraft, missiles, or space vehicles, through mutual support arrangements with other commands. Aerospace control includes ensuring air sovereignty and air defense of the airspace of Canada and the United States. The renewal of the NORAD Agreement in May 2006 added a maritime warning mission, which entails a shared awareness and understanding of the activities conducted in U.S. and Canadian maritime approaches, maritime

areas and internal waterways. (see "NORAD Mission Statement," accessed 4 March 2017, http://www.norad.mil/About-NORAD/.)

[13] Handy, LTGEN R.H., *Alaska Military Snapshot*. ALCOM capabilities brief, Power Point presentation. ALCOM, 23 July 2016, slide 7 and 176th Wing and 168th Wing websites, both accessed 30 April 2017, http://www.168arw.ang.af.mil/ and http://www.176wg.ang.af.mil/.

[14] United States Army Alaska website, accessed 4 March 2017, https://www.army.mil/usarak#org-about.

[15] Smith, LCDR Jerry L, USCG. Operations Officer USCGC Polar Star. Email with author, November 15, 2016.

Dan,

I have wealth of icebreaking information, so please keep me in mind in future correspondence. Ice operations are categorized into domestic icebreaking and polar icebreaking. Domestic icebreaking (DOMICE) focuses on flood mitigation, safety (search and rescue), and facilitating commerce (breakouts for vessel stuck in the ice and ice escorts). The Great Lakes region and Northeast region (New England plus New York), conduct annual DOMICE missions from Jan-Mar, mostly to support the delivery of bulk commodities (coal, taconite, diesel, kerosene, etc.). Those operations are called Operations Coal Shovel, Taconite, and RENEW.

Polar ice operations focus on conducting scientific research, scientific support, and national security (establishing a polar presence) in latitudes poleward of 60 degrees. Current ice operations include Arctic West Summer (AWS) in the north, and Operation Deep Freeze (ODF) in the south. The AWS deployments mostly focus on scientific support with NOAA, ONR, NSF, and Coast Guard R&D Center and involved actual scientific research and sampling. The ODF mission focuses on facilitating the resupply of McMurdo Research Station near the Ross Ice Shelf in Antarctica. The ODF mission closely aligns with the ice escort DOMICE mission, as a channel needs cut in fast ice (fast ice is ice frozen to the shoreline).

Regardless of the area, ice is ice. Most folks ask about ice thickness, which does play a role in ice operations, but really ice pressure is more of a factor. If the ice is loose, then the pressure is low, and ships can transit through with little concern. If the ice is under pressure, typically found with pack ice or fast ice, ships will have a tough time transiting through. They can become "beset" in ice. For high pressure areas, like what's found during ODF, the icebreaker cuts a track in the ice, making a highway for the ship to transit. Fast ice is on each side of the highway, and the broken ice that floats in the highway is free to move or refreeze. There is an art to icebreaking, which revolves around ice management, reading ice fractures (or leads), and using the environmental conditions (ocean currents, tidal currents, and wind) to move the ice.

With this context, I'll answer your questions....

1. Speed is dependent on ice pressure and thickness. If ice is fast and it's during the dead of winter, there will usually be high pressure, and the ice needs somewhere to go to reduce the pressure. I've experienced back and ramming conditions, where the ship is only able to make a ship length at a time before becoming beset; I've also experienced conditions where thick ice is starting to melt (or rot) in the spring and the ship can make anywhere from 3-10kts. If you want hard facts, the capability of the polar class ice breaker is 6ft of ice at 3kts, and 20ft by backing and ramming.

2. An icebreaker is necessary to escort any vessel through the ice (ice escort). Maneuverability is restricted to the width of the channel, which is dependent on ice pressure and thickness. I've

escorted vessels through ice that were 2-3 miles astern, and others that were only a few hundred yards; the difference came from the pressure and specifically how fast the ice fills in behind the icebreaker. For multiple ship escorts, a single icebreaker can break a channel to escort 3-5 ships, but each ship would be quite close to each other to keep the track clear.
3. Not per se....however the ODF mission breaks a channel into McMurdo Research Station, and two military supply vessels provide containers and fuel to the Station. This operation is a joint op with Air Force, Navy, Army, and Coast Guard.
4. I attached a diagram of icebreakers of the world. Polar icebreakers are divided into light, medium, and heavy. So, PALMER is light, CGC HEALY is medium, and CGC POLAR STAR is heavy. I also attached ODF oporder for this year.
This is probably a lot to digest for now, so please let me know when you're ready for the second wave of information.
v/r
Jerry

LCDR Jerry Smith, Jr.
Operations Officer
USCGC POLAR STAR (WAGB 10)

[16] Alaskan Command does not have US Navy forces assigned to it (see ALCOM Capabilities Brief). However, Joint Base Elmendorf-Richardson, where Alaskan Command headquarters resides, list the Alaskan Naval Militia, Military Sealift Command, and Navy Operational Support Command Anchorage as Navy units associated with the base (see http://www.jber.af.mil/Units/Navy/, accessed 30 April 2017). The Alaskan Naval Militia is controlled by the state of Alaska, but is partially federally regulated and equipped; as such at least 95% of its members must be Navy or Marine reservists. It's four mission areas are medical, explosive outload teams, reconnaissance and port security, and naval construction. *Wikipedia,* "Alaskan Naval Militia," accessed 30 April 2017, https://en.wikipedia.org/wiki/Alaska_Naval_Militia.

[17] Alaska's 47,000 miles of coastline, which comprises two-thirds of the entire United States coastline, and Alaska's 32 military facilities, 12 of which are major bases or stations, enable expeditionary and amphibious Marine forces, capable of operating at sea or ashore in an austere environment, to achieve significant operational reach in an immense and harsh environment with limited infrastructure. (see Alaskan Command capabilities brief, 23 July 2016, slide 6.)

[18] There also may be opportunities to leverage existing and future civilian infrastructure to support potential military activities. Commercial facilities in Alaska, particularly in the mining and natural resource industry, are designed to withstand the remote and harsh environment. These facilities must be able to operate independently in extreme cold climate with limited infrastructure. As such, they often include landing strips or helicopter pads to make them accessible by air, can store bulk fuel, feature stand-alone power and communications capabilities, and can support groups of people for extended periods of time with billeting and messing facilities. Such facilities may provide opportunities for dual military and civilian use based on their current configuration or with moderate modifications. This approach may be cost-effective in terms of both initial investment and long term maintenance. Additionally, cooperating with civilian entities enables the military to take advantage of their local knowledge

while also reassuring the population and commercial enterprises that the national government remains invested in their security.

[19] Joint Publication 3-0 *Joint Operations*, 17 January 2017, Figure V-7 "Phasing an Operation Based on Predominate Military Activities, V-13.

[20] The "Flying Column" has been used successfully beginning with the British during the Boer War as well as with the CHINDITS during WWII. (see *A Historical Perspective on Light Infantry* by Major Scott R. Michael, *Defeat Into Victory* by Field Marshal Sir William Slim, and *The Great Boer War* by Byron Farwell)

[21] The Joint Pacific Alaska Range Complex (JPARC) consists of 1.5 million acres of ground maneuver training, 65,000 square miles of air space, and 42,000 square nautical miles of maritime activity areas. (see Alaskan Command capabilities brief, slides 14-19.)

[22] ALCOM capabilities brief, slides 14-19.

[23] U.S. Pacific Fleet Public Affairs Navy From Commander, "Marines Work Together During Exercise Northern Edge 2011," posted June 20, 2011, http://www.cpf.navy.mil/news.aspx/000528 and Yereth Rosen, "Northern Edge military training in Gulf of Alaska gets Navy's OK -- with limits," *Alaska News*, 25 April 2017 https://www.adn.com/alaska-news/military/2017/04/25/northern-edge-training-activities-in-gulf-of-alaska-get-navys-ok-with-limits. In 2011, Marine Aerial Refueler Transport Squadron (VMGR) 452, a Marine reserve KC-130 squadron from Stewart Air Force Base, New York conducted aerial refueling operations in JPAC as part of NORTHERN EDGE. Third ANGLICO, a Marine reserve unit from California, has also conducted fires and airborne training as part of Alaskan exercises.

[24] The Alaskan littorals contain the Aleutian Islands, Alaskan Peninsula, Saint Lawrence Island, Seward Peninsula, and the Gulf of Alaska. Alaska has 58 ports along its extensive coastline, ranging from very small to medium, with the port of Anchorage list by the DoD as a strategically vital US port. (see Word Port Source, http://www.worldportsource.com/ports/commerce/USA_AK, and Transportation Engineering Agency, Seaport Studies https://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/Pages/PortsNationalDefense.aspx, both accessed 20 Dec 2016)

[25] JPARC sea spaces include over 42,000 nautical miles of temporary maritime activities areas (TMAA) for surface, subsurface, and airspace training adjacent to air and land ranges. (see Alaskan Command capabilities brief, slides 14-19.)

[26] ALCOM capabilities brief, 23 July 2016, slide 23.

[27] The USCG possesses five icebreakers, of which four are operational. Of the two heavy icebreakers, only one is operational and the other is being cannibalized for parts to support the operational one. The single light icebreaker and one medium icebreaker support the domestic icebreaking missions on the Great Lakes and in New England. The single operational heavy icebreaker, USCGC Polar Star, predominately supports icebreaking missions in the Antarctic for scientific research endeavors. the remaining medium icebreaker, USCGC Healy, supports Arctic presence missions to include deterrence and search and rescue. (see Smith, LCDR Jerry L, USCG. Operations Officer USCGC Polar Star. Email with author, November 15, 2016.)

[28] United States Coast Guard Website, http://www.overview.uscg.mil/Missions/.

[29] District 17 assets include 52 boats, 15 cutters, and 17 aircraft.

[30] Phillip Karber and Joshua Thibeault, "Russia's New Generation Warfare," *The Potomac Foundation*, 13 May 2016 http://www.thepotomacfoundation.org/russias-new-generation-warfare-2/.

[31] Colonel Robert Fulford, USMC, brief to SAW AY17 students "26th Marine Expeditionary Force (MEU) [and] SPMAGTF-CR-AF 14.2 Deployment Observations" 13 April 2017. In a follow-on email dated 27 April 2017, in accordance with Marine Corps University's non-attribution policy, Col Fulford granted the authors permission to attribute his remarks in this paper.

Bibliography

168th Wing Website. http://www.168wg.ang.af.mil/.

176th Wing Wesbite. http://www.176wg.ang.af.mil/.

About Education Website. "A Geography and Overview of Earth's Arctic Region," http://geography.about.com/od/globalproblemsandissues/a/arcticregion.htm.

ALCOM Website. http://www.jber.af.mil/Home.aspx.

Arctic Council Website. http://www.arctic-council.org.

Bender, Jeremy. "Russia Just Put the Finishing Touches on 6 Arctic Military Bases," *Business Insider*, 7 December 2015, http://www.businessinsider.com/russia-equipped-six-military-bases-in-the-arctic-2015-12.

Castellvi, BGen R. F. *2dMEB Exercise COLD RESPONSE 16 After Action Report.* USMC report for Marine Corps Center for Lessons Learned. Quantico, VA: Marine Corps Center for Lessons Learned Database, June 13, 2016. https://www.mccll.usmc.mil/index.cfm.

Center for Military History. *Aleutian Islands: The US Army Campaigns of World War II. CMH Pub 72-6.* http://www.history.army.mil/brochures/aleut/aleut.htm.

Congressional Research Service. *Changes in the Arctic.* February 14, 2014.

Farwell, Byron. *The Great Boer War.* Pen and Sword, September 2009.

Fuglem, LTC John Olav, Norwegian Army. "Russia and Nato Future Strategy in the Arctic." Unpublished manuscript, 2nd Draft. Last modified AY 2015-2016. Microsoft Word File.

Fulford, Col Robert, United States Marine Corps. *26th Marine Expeditionary Unit (26th MEU) [and] SPMAGTF-CR-AF 14.2 Deployment Observations.* PowerPoint Presentation. Marine Corps University, Quantico, VA, April 13, 2017.

Girard, Maj William H., Canadian Army. "Force Package for the Canadian Arctic." Unpublished manuscript, last modified AY 2014-15. Microsoft Word File.

Grady, John. "Former Coast Guard Commandant Papp: Cooperation with Russia Key to Arctic Development." *U.S. Naval Institute*, August 19, 2015.

https://news.usni.org/2015/08/19/former-coast-guard-commandant-papp-cooperation-with-russia-key-to-arctic-development.

_____"Report: New Forum Needed to Negotiate Arctic Security Concerns." *U.S. Naval Institute*, August 28, 2015. https://news.usni.org/2015/08/28/report-new-forum-needed-to-negotiate-arctic-security-concerns.

Handy, LTGEN R.H. *Alaska Military Snapshot.* ALCOM capabilities brief. Power Point presentation. ALCOM, 23 July 2016.

Headquarters, Department of the Army. *Cold Region Operations.* ATTP 3-97.11/MCRP 3-35.1D. Washington , DC: Headquarters Department of the Army, January 28, 2011.

Headquarters, United Stated Marine Corps. *Logistics Support for Marine Corps Prepositioning Program - Norway (MCPP-N).* Marine Corps Technical Manual (™) 4790-14/1G, Washington, DC: Headquarters United States Marine Corps, June 2013.

Joint Publication 3-0 *Joint Operations*, 17 January 2017.

Karber, Phillip and Joshua Thibeault. "Russia's New Generation Warfare," *The Potomac Foundation*, 13 May 2016 http://www.thepotomacfoundation.org/russias-new-generation-warfare-2/.

Lyles, Lester L., Sherri Goodman, and Robert E. Hunter. "Arctic Science Moves to Center Stage." *Atlantic Council*, 26 September 2016. http://atlanticcouncil.org/blogs/new-atlanticist/arctic-science-moves-to-center-stage?utm_source=Sailthru&utm_medium=email&utm_campaign=DNR%.

Laruelle, Marlene. *Russia's Arctic Strategies and the Future of the Far North.* Amonk, NY: M.E. Sharpe, Inc, 2014.

Martin, MAJ Jonathan R., US Army. "Arctic Opening: U.S. Joint Force Capabilities in 2025." Unpublished manuscript, last modified AY 2015-2016. Microsoft Word File.

Manyx, LtCol Todd. *The Arctic: A Clime and a Place.* Strategic Initiatives Group Scouting Report for the week of 25 Jan 2016.

Michael, Maj Scott R. *A Historical Perspective on Light Infantry.* Research Survey No. 6, Combat Studies Institute. U.S. Army Command and General Staff College. Fort Leavenworth, Kansas: 1987.

Morales, LtCol B. L. *After Action Report (AAR) for Exercise COLD RESPONSE 16 for the period of Jan/2016 - Mar/2016.* USMC report for Marine Corps Center for Lessons Learned. Quantico, VA: Marine Corps Center for Lessons Learned Database, April 22, 2016. https://www.mccll.usmc.mil/index.cfm .

Naval Units, Joint Base Elmendorf-Richardson Website, http://www.jber.af.mil/Units/Navy/.

NORAD Website. "NORAD Mission Statement," http://www.norad.mil/About-NORAD/.

Rainwater, Shiloh. "Race to the North: China's Arctic Strategy and its Implications." *Naval War College Review 66*, no. 2 (Spring 2013): 62-82.

Rosen, Yereth. "Northern Edge military training in Gulf of Alaska gets Navy's OK -- with limits." *Alaska News*. April 25, 2017. https://www.adn.com/alaska-news/military/2017/04/25/northern-edge-training-activities-in-gulf-of-alaska-get-navys-ok-with-limits/.

Sampson, LtCol D. W. Jr. *After Action Report (AAR) for Exercise COLD RESPONSE 16 for the period of February - March 2016.* USMC report for Marine Corps Center for Lessons Learned. Quantico, VA: Marine Corps Center for Lessons Learned Database, June 7, 2016. https://www.mccll.usmc.mil/index.cfm .

Siciliano, John, "Obama Orders climate change to be considered in military planning," Washington Examiner, September 21, 2016, http://www.washingtonexaminer.com/obama-orders-climate-change-be-considered-in-military-planning/article/2602465 .

Slim, Field Marshal Sir William. *Defeat Into Victory.* London: Cassell and Company, 1956.

Smith, Gibson Bell. "Guarding the Railroad, Taming the Cossacks: the US Army in Russia, 1918-1920." *Prologue* Winter 2002, Vol. 34, No. 4. https://www.archives.gov/publications/prologue/2002/winter/us-army-in-russia-1.html.

Smith, LCDR Jerry L, USCG. Operations Officer USCGC Polar Star. Email with author, November 15, 2016.

Stringer, Kevin D. "The Arctic Domain: A Narrow Niche for Joint Special Operations Forces." *Joint Force Quarterly 78*. (3rd Quarter 2015): 24-31.

Stent, Angela E. *The Limits of Partnership: U.S.-Russian Relations in the Twenty-First Century.* Princeton, NJ: Princeton University Press, 2014.

The White House. National Security Strategy for the Arctic Region. Washington, DC: The White, May 2013. https://www.whitehouse.gov/sites/default/files/docs/nat_arctic_strategy.pdf.

Transportation Engineering Agency, Seaport Studies. https://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/Pages/PortsNationalDefense.aspx

Udall, LCDR James M. USN. Arctic and Maritime Planner, J5, ALCOM. Email with author, October 6, 2016.

United States Army Alaska Website. https://www.army.mil/usarak#org-about.

United States Coast Guard. "Major Icebreakers of the World". June 26, 2015. http://www.uscg.mil/hq/cg5/cg552/images/2040626%20Major%20Icebreaker%20chart.pdf.

United States Coast Guard Website. http://www.overview.uscg.mil/Missions/.

United States Department of Defense. *Arctic Strategy*. Washington, DC: Department of Defense, November 2013. http://www.defense.gov/Portals/1Documnets/pubs/2013_Arctic_Strategy.pdf.

United States Department of the Navy. *A Cooperative Strategy for 21st Century Seapower.* Washington, DC, March 2015.

United States Department of the Navy. *U.S. Navy Arctic Roadmap: 2014-2030*. Washington, DC: Navy Task Force Climate Change, February 2014.

United States Marine Corps. *Marine Operating Concept: How an Expeditionary Force Operates in the 21st Century*. Washington, DC, September 2016.

United States Pacific Fleet Public Affairs From Commander. *Navy, Marines Work Together During Exercise Northern Edge 2011.* Posted June 20, 2011. http://www.cpf.navy.mil/news.aspx/000528.

Word Port Source Website. http://www.worldportsource.com/ports/commerce/USA_AK.

Wikipedia Website. "Alaskan Naval Militia," https://en.wikipedia.org/wiki/Alaska_Naval_Militia.

Wikipedia Website. "Arctic Policy of Russia," https://en.wikipedia.org/wiki/Arctic_policy_of_Russia.