

Getting Ready for Arctic Operations

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Abstract: Currently the US Coast Guard has no personnel or facilities permanently assigned north of the Arctic Circle. As the ice cover is reduced, the resulting additional shipping will require the performance of missions in areas never seen before. Before this happens, analysis needs to be done to determine how the service can best organize and execute its missions. The first major steps are being taken this year to determine what it takes to perform the necessary tasks. Our approach will be to deploy several helicopters and boats to Point Barrow for two weeks this summer, review how other organizations and countries are performing related tasks, and identify additional gaps that need to be researched. Finally, monitoring of environmental conditions will be needed to ensure safe operations.

I. Introduction

United States Coast Guard (USCG) vessels and personnel have a long history of sailing in the Arctic having been the sole US government representatives in the early years, providing security and medical care and rescuing whaling ships that had been frozen in. Icebreakers are still routinely deployed north of the Arctic Circle. But as the ice recedes for larger periods of time, the USCG and thus the Seventeenth District (D17), headquartered in Juneau, will be called upon to perform its multiple missions in a larger area north of the Arctic Circle. Currently, there are no personnel or facilities permanently stationed north of this line. The closest air station is Kodiak (600 miles south), the closest office is Anchorage (over 400 miles south) and the closest large cutter is in Seattle. The North Slope of Alaska (within the Arctic Circle) has about 2500 miles of shoreline. For many of its missions, the CG is assisted by local organizations. The North Slope Borough has a search and rescue (SAR) capability, the oil companies and State of Alaska provide security and local oil spill response organizations (OSROs) provide emergency response (Alaska Clean Seas and Alaska Chadux Corp). The oil companies have planned to provide their own spill response vessels during the summers of 2008 and 2009 for exploration and drilling. The Department of Defense provides SAR through the Alaskan National Guard with cooperation with Canadian forces.

Arctic response problems were brought into the light when the M/V Seladang Ayu lost power and eventually broke up off Unalaska Island in the Aleutians in 2004. During the rescue, a CG helicopter crashed and 6 crewmen of the vessel died. Miles of pristine shoreline were oiled in remote locations that could only be accessed by helicopter. In some cases, living quarters were established in these areas for workers in case the weather turned bad and the helicopter could not return. Much of the cleanup had to wait until spring and summer. [1]

This paper will provide a brief brush of the issues, USCG missions, current efforts and recommendations for the future. It is not intended to cover all topics in detail but will provide an overview of the problems being faced. Both D17 and Coast Guard Headquarters have formed working groups to determine policy and implementation issues but final decisions have not been made on the best way to move forward.

II. Issues

There are many unanswered questions concerning what will happen with the Arctic environment and how commercial, government and private entities will react to increased activity. While the USCG is interested in the environmental change, we do not have the funding and expertise to assess and predict these changes, and, as a result rely on other research organizations. Efforts like the Arctic Observation System and research being done during the International Polar year are of high interest but the results need to be framed into a CG perspective. Rather than looking into the resulting impact of climate, we need to get information about what risks are involved and what capability is needed to respond to those risks.

These risks can be generally categorized into political, commercial, and those involving indigenous Alaskans and wildlife. All of these elements interact, and it is not clear how to best formulate needed policies so all can coexist. One of the main focuses for the political process is the United Nations Law of the Sea (UNLOS) Convention which came into effect in 1994 [2]. Each country has 10 years after ratifying the treaty to submit a claim that can expand their Exclusive Economic Zone (EEZ). UNLOS documents provide the conditions for mapping and providing information about the extent of the continental shelf. For the Coast Guard, the implications are that the Area of Operations (AOPS) may extend as much as 350 miles from the coast. The CGC Healy has been doing bathymetric studies off the north slope of Alaska for many years in trying to

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document that area. (Fig 1) The US has not ratified the treaty but our neighbors (Canada and Alaska) have. This issue may cause more boundary disputes than are already in existence. It may also complicate issues with transportation through Canada's Northwest Passage.

Commercial interests in the Arctic are varied. These interests include energy exploration, access to mines, fishing, eco-tourism and various type of shipping. All have multiple complex issues that need to be addressed before any are implemented. Some examples:

1. Oil/gas exploration has been put on hold through lawsuits bought by native organizations;
2. The largest zinc mine in the world (Red Dog) wants to increase production (and shipments to/from the mine);
3. The National Marine Fisheries Service (NMFS) initial assessment is that there are limited commercially-viable fisheries (with possibly the exception of crab) and expect to place a moratorium on all commercial fishing [3];
4. The vessel that sank in Antarctica last year (M/V Explorer) had been scheduled to come north this year.
5. While the Russians and Norwegians must use vessels on a routine basis in their northern climate and have developed specialized

t ice breaking cargo and LNG tankers with the help of the Swedish company Aker ,the threat of any ice has kept vessels away from the northern areas of the US and Canada. [4] The commercial shippers have indicated a need for ice-free areas before taking the risk of use of the northern areas.

What may be the most important issue is the effect the changing arctic will have on indigenous people. The main impact is coastal erosion and its affect on the sustenance hunting. Coastal impacts are already being felt; the lack of ice has exposed the land to severe erosion. The Army Corps of Engineers (ACOE) has already been investigating ways to save some coastal towns by moving them [5]. There are already a large number of natural oil and gas seeps, and exploration and development may cause more. Spill response in these remote areas is a serious challenge. Some wildlife species may move locations, change the timing of their moves and be forced to adapt to a new environment. These changes may be caused by climate or human intervention. Indigenous peoples must be engaged to find solutions in order to protect their culture and livelihood.

Wildlife and protected species also have an important role for indigenous people. The hunting of Bowhead whales is allowed; the International Whaling Commission (IWC) has permitted up to 280 to be taken by between 2008 and 1012 [6]. But there are four types of seals, 7 types of whales, a porpoise and two eiders that are on the protected species list now and more may soon be added. These are protected under the Endangered Species Act and Marine Mammal acts.

Under the Arctic Council, the Protection of Arctic Marine Environment (PAME) Working Group developed 4



Figure 1 Economic EEZ of Alaska

general scenarios of how the combinations of multiple interests may evolve. These range from an Arctic race that is a “no hold barred” rush for resources; to a polar preserve that has stringent no shipping zones Fig 3 [7]. Only time will tell how this will play out.

III. USCG Missions and Initial Input

The USCG has 12 missions (see Table 1) that are executed on a daily basis. Although the Coast Guard has a long history in Alaska dating back to when it was bought from the Russians, activity has been limited on the North Shore. Personnel were deployed for security and spill response when offshore islands and pipelines were constructed in the 1980s. This past year, D17 instituted C-130 flights every other week from Kodiak, one of which traveled to the North Pole in September, 2007 [8]. Waterway Analysis and Management System (WAMS) analysis has been performed in Kotzebue Sound, AK in 1994 and the North Slope in 2003, and evaluated the need for buoy and navigation systems [9 and 10]. Both recommended no investment at that time, although the CG



Figure 2 PAME Scenarios

has contracted out a buoy system at Kotzebue Sound since 1924 to support the Red Dog mine in the world. Icebreakers have routinely performed Arctic missions, with the Polar Sea going to the North Pole in 1994 and the CGC Healy making the journey in 2001. The first CG High Endurance cutter, the CGC Mellon, moved through the Bering Strait in July of this year. The CG has coordinated 28 long-range Search and Rescue (SAR) cases in the past 10 years. One search in 2004 for overdue native hunters cost more than \$300K and the helicopter off the CGC Healy played a crucial part in finding the hunters on a remote beach [11].

Additional information needs to be gathered on all CG mission areas before any assets can be deployed or structures built. These include current and future environmental conditions, user information, logistics, communications, human factors and costs. There are identical information needs across all mission areas. Some information is needed for planning and other information is needed for the actual execution of the mission. Information is also required to perform trade-off studies to whether CG directly performs the effort or other contractors or support organizations assist with the tasks. There are two ways of collecting this information; the first is to document the actual risks using a “risk-based approach” and the second is to develop potential scenarios.

When using a risk-based approach, it is best to use actual data. The current situation is compared to future data as it becomes available. The Arctic Council’s Emergency Prevention Preparedness and Response (EPPR) Working Group did a full risk assessment of the entire Arctic region in 1996 and concluded that in the US area, oil exploration and production were the biggest risks. [12] In 2008, D17 has projected there would be 70 vessel transits off the North Slope and over 300 through the Bering Strait and Chukchi Sea, with 7 of these being tourist boats [13]. The number of fishing vessels that participate in Federal Fisheries (3-200 nm) have decreased, but there are still hundreds of vessels following the fish. Other trends and information can be gathered by observing what other locations are doing. Canada is tracking vessels using their RADARSAT-2 satellite. [14]. The Defense forces of many nations use submarines to track vessels of interest. Only by tracking can the US or any nation determine the vessels that are accessing their economic or security zones.

Some of these risks can be framed with respect to other areas of operation. For example, while the CG may not operate in the middle of the winter in the Arctic, the average temperature in Barrow, AK in August is about the same as Kodiak, AK in April. For offshore and temporary deployments already occurring in the Bering Sea, that could be used as a baseline for Arctic deployments by comparing any differences in operating procedures and revising them as needed. As another example, D17 can use information generated by other temporary deployments in the Aleutians of aircraft to support fishing law enforcement in places like Cold Bay.

Table 2 CRRC Workshop Recommendations

Opening the Arctic Seas
Envisioning Disasters and Framing Solutions
Common Recommendations from Workshop
Make revisions to IMO guidelines concerning Polar regions and make them mandatory
Develop place of refuge location and guidance
Develop international plans for SAR and environmental response
Increase emergency response equipment
Expand communications and vessel transit networks
Improve Arctic baseline information for things affected by incidents
Need real-time data for weather, currents, waves, etc.
Outreach for expectations management for incident response
Include Indigenous Peoples
Invest in Research and Development
Perform environmental risk and impact assessments.

Table 1 CG Missions

US Coast Guard Missions
Aids to Navigation
Ice Operations
Marine Environmental Protection
Ports and Waterways and Coastal Security
Defense Readiness
Drug Interdiction
Alien Migration Interdiction
Law Enforcement
Living Marine Resources
Marine Safety
Search and Rescue

For approaching Arctic Scenarios, the Coastal Response Research Center (CRRC) at the University of New Hampshire conducted a workshop in March 2008 titled “Opening the Arctic Seas: Envisioning Disaster & Framing Solutions.” Five major arctic incidents were profiled that included mass evacuation, salvage, fire fighting, oil spill response and threatened habitat. Experts were asked to provide recommendations for future efforts and research, and these are provided in Table 2 [15]. The CG needs to develop additional scenarios that address other missions such as vessels that are poaching, smuggling people or contraband, specific mass evaluation or other law enforcement events.

IV Current Data Gathering

In order to obtain information about operations in the Arctic, the Research and Development Center (RDC) is assisting D17 and the office of Assessment, Integration and Risk Management (CG-51) at CG Headquarters in obtaining information that can be used to develop a mission analysis plan in the future. These analyses could lead to the acquisition of assets (either infrastructure, aircraft, or vessels) and the personnel needed.

Most of the data being collected is for the Forward Operating Base (FOB) at Barrow from July 27 to August 11, 2008. There will be two HH-65 helicopters, two 25-foot patrol boats, a communications trailer and a community/tribal liaison team. A total of about 40 personnel will have local accommodations and eat at local restaurants. The information being collected includes vessel traffic, environmental conditions, missions performed, human factor issues and costs. The costs are very important as getting a handle on what it takes to operate in this environment is crucial. Most of the data will be gathered through routine CG messages and collection techniques. Other data will be gathered through interviews and analysis of the after-action reports to determine the extent of future deployments and the advantages and disadvantages of building an infrastructure to support the Coast Guard's missions.

Outside data will also be utilized as it becomes available. For example, an Arctic Marine Shipping Assessment (AMSA) is due from the Arctic Council in the spring of 2009 [16]. This type of effort has been done previously but vessel passages and needs in the US sector has always been much smaller than those in Northern Europe so it is not clear if sufficient data is available.

Data is being gathered for the Coast Guard through a secure Intranet Microsite. A list of microsite topics is included in Table 3. This information, which includes copies of presentations, research reports and links to news events, can provide a background for CG decision-makers.

Table 3 USCG Arctic Operations Support Data Site

USCG Central Arctic Support Microsite Topics
-Arctic Organizations (points of contact)
-CG D17 (with sub-folders for Sector Anchorage and 2008 Forward Operating Base in Point Barrow, AK)
-Commercial Shipping
-Commercial Fishing
-Communications Issues
-Cultural/Historical
-Economic
-Environmental Conditions (weather, sea state, ice coverage, seismic info, etc)
-Environmental Response
-Fish & Wildlife
-Ice Breaking
-Logistics Issues
-Maps/Imagery
-Marine Inspections
-Maritime Domain Awareness (MDA)
-Modeling and Simulation
-Miscellaneous
-National Defense
-Oil/Natural Gas Exploration
-Arctic Organizations/Points of Contact
-Pipeline
-Port Security
-Recreational Boating
-Requirements Documents (MAR, MNS, etc)
-Search and Rescue
-Trip Reports (RDC)

V Future needs

There is a large amount of research being done through multiple conferences and workshops that address multiple topics too numerous to name here. Those that may be immediately helpful include a large Joint Industry Projects (JIP) conference on oil spill response (funded by European companies) [17] and a joint US/Canada Oil/Gas research forum scheduled for the end of October in Anchorage. But before routine operations can occur, much still needs to be done. The following is a short list of topics that should be explored further:

Environmental Assessment: gather weather and ice conditions

- Define operational conditions for people and equipment by determining when operations will most likely occur
- Extent of those conditions during the open-ice and shoulder seasons
- How CG equipment needs to be modified; consider International experience and standards

Human factors: identify risks

- Identify safety issues (working in cold , remote environments)
- Identify and train on cold weather survival techniques
- Determine equipment and clothing needed for CG personnel and other users

Infrastructure Issues: identify construction and support issues

- Building structures
- Building runways
- Upkeep and preservation during non-use
- Potential floating bases (leverage Department of Defense and oil industry use of offshore facilities)

Logistics: Identify methods to transport and stage equipment and personnel

- Transportation: Via air, water and ground
- Storage; Consider short and long-term

Spill and SAR Response capabilities

- Develop ice rescue techniques (cooperate with CG in Great Lakes)
- Commercial cooperation: Obtain methods for support from existing infrastructure
- Oil spill response

Communications: identify gaps in coverage

- Towers
- Power
- Reliability issues in cold temperatures

Navigation (both with and without ice)

- Buoys and day markers
- Automatic Identification Systems (AIS) and Vessel Marking Systems (VMS): determine use and receivers

International and Indigenous Peoples Engagement: work closely to document potential changes

- Extent of movement
- Erosion Issues
- Tracking wildlife movement

CG Assets

- Aircraft Capabilities
 - C-130 – need equipment that can operate in -40 degrees F
 - Helicopters – May need self-rescue
 - Ice Breakers – need additional cutters
 - Ice Strengthened Vessels needed for working in broken ice
- Vessels
 - Small boat survival and operations
 - Large vessels; (Need ice strengthening)

VI Conclusions

The US Coast Guard is moving into a large, harsh environment. Even though the Coast Guard has a history of operating in the Arctic, there are new challenges. Many of the CG assets are already stretched to the limit especially after the events of September 11, 2001. In addition, due to problems encountered in the current DEEPWATER acquisition and the current economy, any new requests for equipment and personnel must be strictly justified. The CG must be honest in assessing any risks and the impact any deployments may have on the budget or other areas. The CG must engage other federal, state, local and International partners to ensure the safety and security of all who will live and work in the Arctic.

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