# SURFACE SITREP

*A newsletter distributed by the Surface Navy Association*

*Volume XXIX, Number 1* *March 2013*


## *The Arctic is Probably the Fastest-Growing Maritime Environment . . .*

## It's Critical That We know What's Going On.

## Interview with Rear Admiral Thomas P. Ostebo, USCG Commander, Seventeenth Coast Guard District

### *by CAPT Edward Lundquist, USN (Ret)*

**Let's start with maritime domain awareness in the Arctic. Why is that important? Are there any vessels up there that we need to keep track of? Is there a security concern about the Arctic? Why do we have to have MDA in the Arctic?**

I would submit that the answer to that question could be, "Why do we need to have MDA anywhere?" Whether it's the east coast, the Straits of Florida, the Gulf of Mexico or any other region of the United States, we need to have MDA. I think the idea is to have knowledge about what's going on offshore—knowledge about who's operating there, why they are operating there, and what are the risks that our nation faces based on those operations. Wherever there is increased maritime traffic; there are more risks for allisions, collisions, groundings, and there may be real threats to national security. If you look at the top of the world and you look at the amount of growth and activity up there, the Arctic is probably the fastest-growing maritime environment. We're seeing a growth of maritime activity offshore, from commercial activity such as transshipments across the northern sea route or destination traffic to the Arctic carrying everything from ecotourists to exploratory activities with industry. In August 2012, at one point we saw about a hundred vessels offshore from Barrow. If you take a look at the overall traffic through Unimak Pass down on the Aleutian Islands and the Bering Strait itself, we've had a doubling of cargo tonnage just from 2011 to 2012 going through the Bering Strait across the northern sea route. All of that brings the interest in the activities offshore of the U.S. in the Arctic to a new high, and because of that interest and increased activity, we need to have MDA. At one point in 2012 we had more than 20 research vessels operating in the Arctic. Many of those were on our extended continental shelf. What were they doing? What were they looking for? Why are they there? The Chinese have an icebreaker, the Xuelong, the largest conventional ice breaker in the world, which operated extensively in the Arctic this year, and transited through our exclusive economic zone. Is that of interest? I would submit that it clearly is. We should know what other people are doing there. So the need for MDA in the Arctic is real. The maritime activity, is growing at an unprecedented rate, and with the reduction in ice, this past summer being the lowest ice level ever recorded, we can expect a time very likely in the future where we would have an ice-free Arctic and ships to transiting across the globe by going over the top.

> *"District 17 includes the North pacific Ocean and the Gulf of Alaska, all of the Bering Sea and part of the Arctic Ocean. So it's a really huge piece of water - - more shoreline here than the rest of the U.S. put together."*
>
> *Rear Admiral Thomas P. Ostebo, USCG, Commander, Seventeenth Coast Guard District*

**You said you could see a hundred vessels near Barrow?**

Throughout the summer, we used the assets that were available to us, such as the Alaskan Marine Exchange, the Automated Information System, our own visual reports, and information from industry to help us understand the amount of activity in the region. We looked at how many vessels were operating in the Arctic, and at one point this summer along the North Slope we had almost a hundred vessels. Many of the vessels belonged to industry, but we had the whole gamut from ecotourists to adventure travelers, and commerce going in and out of Barrow. While we were operating at our forward operating location in Barrow, a

*The conical drilling unit Kulluk sits grounded 40 miles southwest of Kodiak City, Thursday, Jan. 3, 2012. The Kulluk grounded after many efforts by tug vessel crews and Coast Guard crews to move the vessel to safe harbor during a winter storm. U.S. Coast Guard photo by Petty Officer 2nd Class Zachary Painter.*

barge delivering fuel ran aground on the beach and required the removal of its fuel in order to be refloated. We had a marine hazard, offshore activity, and many of the vessels were foreign flagged, so I do think it's critical that we know what's going on.

**What's the Marine Exchange of Alaska?**

The Marine Exchange of Alaska is a maritime organization that provides information, communication and services that aids safe responsible maritime operations. They monitor vessels using automatic identification system information to provide valuable safety, navigational and logistics information to the maritime community.

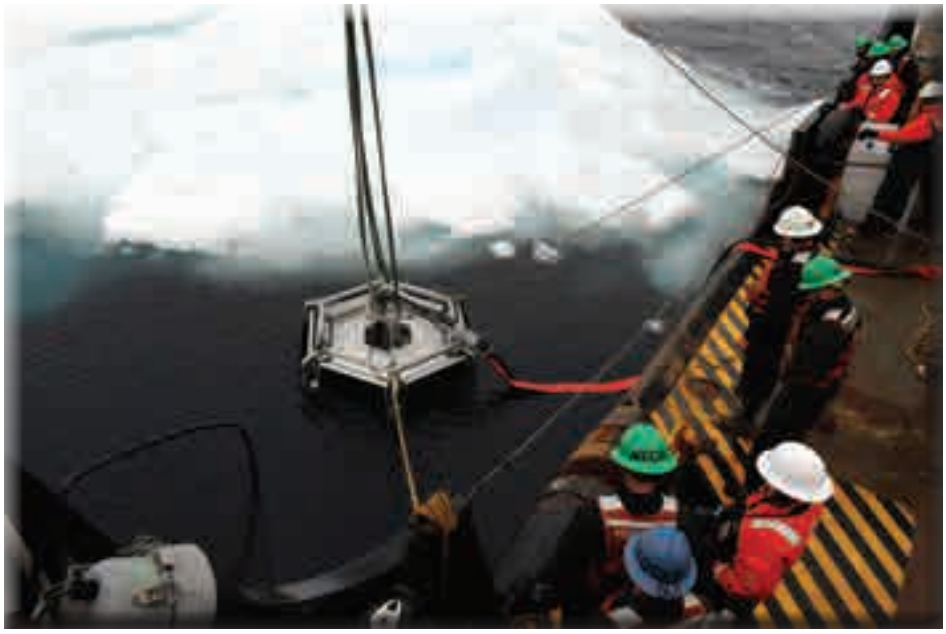
So let's talk a little bit about the operating area itself. How would you characterize or describe District 17, the area that you are responsible for?

When you look across my area of responsibility, the maritime environment that encompasses District 17 includes the North Pacific Ocean, the Gulf of Alaska, a large portion of the Bering Sea and Arctic Ocean. So it's a really huge piece of water—with more shoreline than the rest of the U.S. put together. Everything north of the Aleutian Islands and the Bering Sea is by definition "the Arctic." Our operating area includes places like Unimak Pass out near Dutch Harbor, which is one of the fastest growing international straits on the planet, where you have all of the east/west great circle route traffic in the North Pacific going in Canada or Seattle from China, from Korea and Japan, all go through there. You're talking thousands of ships a year. We probably see two or three hundred a month going through this very narrow pass that has little infrastructure around it and limited response capability.

The great circle route between Korea and Prince Rupert is almost a straight line that goes right through Unimak Pass and then right out past Attu and Adak on the far end of the Aleutian Islands. Unimak Pass is right next to Dutch Harbor on the east side of Unalaska Island. There are probably 3,000 ships a year that go through there—many of them have a single hull, are foreign-flagged, are going from a foreign port to another foreign port, mainly in and out of Prince Rupert, Canada and they're carrying everything from cars to electronics to oil and gas. It's also very narrow. It's is a place where you have incredibly dangerous waters and on a routine basis we'll have hurricane force winds. I get a weather report three times a week for that area and it's always exciting to see how much the weather changes. Most people don't know about the Unimak Pass except for the mariners that are operating there. The majority of the Aleutian Islands are part the Alaska Maritime National Wildlife Refuge and it's all a very sensitive area. And there are homeland security risks when everything from stowaways to illicit cargoes may be coming through there.

*Rear Adm. Thomas Ostebo, commander, 17th Coast Guard District and 17th District Incident Management Team commander, observes the conical drilling unit Kulluk from an MH-60 Jayhawk helicopter during a second overflight Tuesday, Jan. 1, 2013. The Kulluk grounded on the southeast shore of Sitkalidak Island Monday night. U.S. Coast Guard photo by Petty Officer 1st Class Sara Francis.*

Dixon Entrance is the third major international strait that Alaska has and it's south of Ketchikan. There are thousands of vessels that go east and west, and then north and south, up through Dixon Entrance: We have cruise ships carrying more than a million passengers a year transiting north and south there; and all of the U.S. bound and Alaskan freight goes through there as well. So you have this high-traffic intersection with lots of different maritime activity. There's no vessel separation traffic scheme, no response equipment, and the area does not have the response capabilities like you would find at Prince Rupert and Valdez. Valdez is soon to be surpassed by Prince Rupert as the largest maritime exporting point for oil and gas in North America. So you have all the traffic that I've already talked about, and now you're going to have oil and gas tankers going east and west through there.



*Coast Guard personnel aboard the Coast Guard Cutter Sycamore set a DESMI "Polar Bear" skimmer into the Arctic Ocean using the buoy tender's crane, near Barrow, Alaska, Aug. 2, 2012. The skimmer, specifically designed to recover oil in ice-strewn water, was used during the third and final day of an oil recovery systems exercise. U.S. Coast Guard photo by Petty Officer 2nd Class Kelly Parker.*

Prince Rupert has a brand new railhead, a brand new highway, and a brand new port. It's going to be the center point for and the consolidation point for the Canadian west coast and it's a growing port.

So I have major international straits of interest in my area of responsibility, challenging weather, and an operating area that probably has the most limited offshore infrastructure, response infrastructure, and MDA infrastructure on the planet. We have lots of international partners between the Canadians and the Russians and everybody else—all the Arctic nations—that have an interest in this operating area. We have international bodies of water, increasing maritime activity, very little response or prevention capability in the area, limited MDA and poor weather overall compared to other places in the U.S. Our response times are long and our logistic support for response is extremely difficult. So that's the operating environment that we find ourselves in.

*Coast Guard personnel aboard the Coast Guard Cutter Sycamore use a crane and handling lines to lower a DESMI "Polar Bear" skimmer into the Arctic Ocean during an oil recovery exercise near Barrow, Alaska Aug. 2, 2012. The Sycamore crew holds a Spilled Oil Recovery System exercise annually to maintain proficiency, but this was the first of its kind to be held in the Arctic Ocean. U.S. Coast Guard photo by Petty Officer 2nd Class Kelly Parker.*

**With this heavy traffic and with confined waters and with bad weather, I suppose that you have safety concerns.**

Yes, look at Costa Concordia that hit the rocks in Italy with the loss of life. Try imagining that happening up here. In Southeast Alaska we have well over a million passengers a year coming here on cruise ships, and we're seeing larger and larger cruise vessels for ecotourism go up in the Arctic. What if you have a cruise ship that's plying relatively uncharted waters in poor weather and possible ice conditions, and they have a problem in the Arctic? How do you rescue 300 people off the coast of Wainwright? I would submit that it would be an extremely difficult challenge that would play out in real time on YouTube or CNN, where we would be stretched to conduct a reasonably timely and effective response. From a historical perspective, look at the cruise ship Prinsendam case in

Southeast Alaska in 1980, where 520 passengers and crew were lifted off of that ship in the largest air-sea rescue in history; or the M/V Selendang Ayu that ran aground off Unalaska Island in 2004; or Exxon Valdez in 1989. What if those events happened further up in the Arctic because of all this increased maritime traffic? Some folks say, 'well, what's the real likelihood of that happening?' I can tell you that this past year we had a half dozen cases of allisions, collisions, and groundings. We had the Polar Wind, which was a tug and barge with fuel and hazardous waste and containers of fish and everything else that ran aground just off the beach near Cold Bay. We barely got that off there without a calamity. So I would submit that all of this maritime traffic increases the risk of a maritime accident, and we can simply look at history to see the kinds of accidents that we could have offshore. If one of those were to take place in the Arctic, we would start with a mass rescue operation, followed very quickly by an environmental disaster response, and all of this would play out in a place that is extremely remote with very limited infrastructure. It might include foreign vessels in the mix, as well. So that is a very, very challenging and a very real problem that I face day to day and I think, moreover, that the State of Alaska and the nation faces every day.

*JUNEAU, Alaska - Petty Officer 1st Class Philip Ketcheson describes the capabilities of Coast Guard Station Juneau's 45-foot Response Boat-Medium to Capt. Scott Bornemann, Rear Adm. Thomas Ostebo and Air Force Lt. Gen. Stephen Hoog Dec. 12, 2011. Hoog, who recently assumed command of Department of Defense operations in Alaska toured the station during a visit with Ostebo at District 17 headquarters in Juneau. U.S. Coast Guard photo by Petty Officer 3rd Class Grant DeVuyst*

**You talk about scarce infrastructure and resources. What do you have to monitor the area or to respond?**

We have met with every stakeholder available, including DOD, USNORTHCOM, Joint Task Force Alaska, Alaskan Command; the State of Alaska and their environmental response folks, the adjutant general for the State of Alaska, the National Guard; local communities; tribal communities; and industry representatives to talk about how we solve this problem in the short run. This past summer Arctic Shield brought all of us to together to talk about what we would do if we had an event in the Arctic. What can everybody contribute? For example, folks like the Alaskan Marine Exchange have gone out of their way to add infrastructure and capability up there. So we've leveraged our partners and we've walked through what we would do if we had a mass rescue. What would be the community centers of excellence that could help us out? Nome, Barrow, and Dutch Harbor are the three places that have been alerted to this growth in operations and have stepped up as local community partners to help us do that, whether that's emergency medevac use of their hospital, triage in and out of there, and use of the airports and air facilities between the Coast Guard and the National Guard to take people to higher levels of care. All these stakeholders have input into an environmental disaster. So if you had something like a Deepwater Horizon or an Exxon Valdez, we have trained people on how to pick up oil off the beach, report marine mammal sightings, and do everything from cleaning wildlife to contributing to the greater spill response effort. Where we are right now is a pick-up game in the event of a mishap that involves all the partners across the state. I think we need to evolve to the appropriate shore-based infrastructure supported at the national level and the national capabilities that can be brought to bear here in Alaska, which would be on a par with those that we would find in the lower 48.

**You have talked about the international, civil, tribal, local relationships. How would you characterize the degree of cooperation?**

The Coast Guard has led initiatives to bring folks together and it's been extremely fruitful. There is definitely a need for long term infrastructure, onshore, offshore and afloat. What is the shore-based infrastructure that we need in the long run so that we can properly run an incident command system like approach to a mishap? For example, we all know that we're quickly going to run out of communications capability and bandwidth in the event of a major mishap along the North Slope. Barrow and other places in the Arctic are not connected by fiber optic and if you look at the demand for command and control and information that we've seen since 9/11, Hurricane Katrina, Deepwater Horizon, and Hurricane Sandy, we would quickly overwhelm the communications capability up there. So there is a lot that we're doing with partnerships. You mentioned international partners. USNORTHCOM has done a great job working with the Canadians in getting some agreements in place on how we want to address the Arctic as it continues to emerge in the future. I think the Coast Guard as well as the Department of Homeland Security has done a great job in engaging both the Canadians and the Russians. I've been to both countries several times in the last year, looking for cooperative solutions to issues such as vessel traffic separation schemes, search and rescue response, oil pollution, and fisheries management.

*NOME, Alaska — Coast Guard Rear Adm. Tom Ostebo, District 17 commander, learns about the capabilities of an Aeryon Scout unmanned aerial vehicle at the Nome City Hall Jan. 13, 2012. Denise Michels, the mayor of Nome, provided a tour of the ongoing fuel transfer preparations in Nome. U.S. Coast Guard photo by Petty Officer 2nd Class Charly Hengen.*

**It's not just a home game.**

You're absolutely right. The Arctic and these bodies of water that I'm talking about, the Bering Strait, Unimak Pass, and Dixon Entrance are international bodies of water, international straits, and the ability of the U.S. to exercise unilateral oversight or restrictions in those areas are severely hampered. So it's not like Chesapeake Bay or Cape Cod Bay or some of the other places where we see major traffic, the rest of the world has a say in what goes on in these spaces. The rest of the world has an interest in the Arctic, a good portion of the Arctic itself is in international waters and it's available and open to the rest of the planet, hence you have countries as far away as China and India plying the waters of the Arctic to see what advantages they can find for their own nations up there. So this is very much international space and not a space that necessarily lends itself to American dominance. We can't tell people what to do. I get comments such as "Well, why don't we just go and put a vessel traffic separation scheme in the Bering Strait and make everybody required to be double-hulled and make them have a tug when they go through there?" You can't do that. That would be contrary to international law, like the Straits of Hormuz or anyplace else. The oversight that we can do for MDA in this space is closely watched by the United Nations through the International Maritime Organization and other organizations. The rest of the planet is watching what's going on.

**Well, you have to have a seat at the table.**

One of the things we are trying to do is to be as forward-leaning as we can to look after and protect our national interests, whether they are environmental interests, security interests, or defense interests. And we're doing that. And we're doing that with all the partners that we can. But in some places, such as the Bering Strait, there is very little we can do in the control of those spaces.

**What do you not have that you really would like?**

It would be comprehensive MDA and assured communications throughout the region. When I go up to the 50,000 foot view and say, "What do I really need?" MDA and assured communications in the Arctic are fundamental to looking out after the interests of the U.S. One of the ways you do that is with assets like ships, shore-based infrastructure, and technology.

One way to get those capabilities is floating assets. When you look across the Coast Guard shipbuilding enterprise and where we're going with our shipbuilding work, there is a lot of capability. A National Security Cutter, for example, was operating up in the Arctic this past summer. It's not an ice breaker, but it is a highly capable ship and it did a phenomenal job—not only for District 17, but for the nation in the capabilities that it brought offshore. And I think the NSC program needs to continue forward so that we can bring them up here in the times of an ice-free Arctic. Ice breakers in particular, would be a valuable resource. The administration and Congress decided to take one of our ice breakers—the Polar Star—out of a mothball condition and

*Rear Adm. Thomas Ostebo, commander District 17, explains Coast Guard operations in the Arctic and the distances covered by Coast Guard assets throughout Alaska to Secretary of Homeland Security Janet Napolitano, Monday, Aug. 6, 2012, during a tour of Base Kodiak, Alaska. Napolitano toured Base Kodiak and addressed assembled Coast Guardsmen at Air Station Kodiak while on a visit to several Coast Guard units across the state. U.S. Coast Guard photo by Petty Officer 3rd Class Jonathan Klingenberg.*

bring it back into active service. The Coast Guard Cutter Polar Star will be coming out this summer, which essentially doubles our ice breaker capabilities for the nation. We'll have more capability to use in the Arctic, not only for scientific work, but also to bring all the missions of the Coast Guard to bear in the Arctic, particularly in times of ice-covered waters. The Coast Guard Cutter Healy is a great ship. I wish we had more of them. It's doing great work, as you saw last year when it escorted the Russian tanker Renda to Nome. That was a historic event that we were able to accomplish with the Healy and its crew.

**You mentioned science and technology. What would you ask the S&T and research and development communities to look at for new technologies that could help you?**

From an S&T perspective, a MDA system that provides everything from ice coverage and weather information, to vessel traffic information in the Arctic, with the ability to give us oil spill or environmental information would be beneficial. If we had that type of technology then we have a more thorough understanding about what's going on offshore. Then if you ask me what's going on in the Arctic today—how many ice breakers are up there; what's the weather like; what's the ice coverage I could put that picture together and tell you.

**You must be proud of the Coast Guard men and women up there in Alaska?**

We're the smallest Coast Guard district when it comes to staffing, but the few Coast Guard men and women we have up here all do a great job. Just turn on your TV and watch Coast Guard Alaska and you'll be impressed with the men and women up here, not only how brave they are, but how adaptable they are to the operating environment up here. It's amazing. I couldn't be more proud to be their district commander.

# Coast Guard Research and Development Center Puts Good Ideas Into Action

## *By CAPT Edward Lundquist, USN (RET)*

"We're here to support all 11 Coast Guard mission sets," says Capt. Alan Arsenault, commanding officer of the U.S. Coast Guard Research and Development Center (RDC) in New London, Conn.

From the Arctic Ocean to the Gulf of Mexico, RDC is bringing science and technology (S&T) and research and development (R&D) to finding new solutions to meet Coast Guard challenges. The Center manages dozens of ongoing projects that help inform leadership on strategies, policies and acquisition.

RDC works on coming up with new ideas, as well as evaluating suggestions, proposals and concepts. It holds an annual idea submission review in March that collects all the good ideas from across the Coast Guard enterprise and uses them to develop its R&D project portfolio for next year. "We use broad area announcements to get the word out that we're looking for something," Arsenault says. "We looked at about 4,000 ideas during Deepwater Horizon alone."

The RDC team collaborates with the Naval Research Laboratory in Washington, the Naval Submarine Medical Research Laboratory (NSMRL) across the river in Groton, as well as other federal laboratories, academic institutions and industry. Many of these efforts are partnerships involving cooperative research and development agreements (CRADAs), which are agreements between the federal government and private sector to work together on a mutually beneficial project.

"If industry comes up with a capability, we can provide an operational test bed," Arsenault says. "For example, we have a huge inventory of small boats—hundreds of them—so we can coordinate platforms for project work," says Bert Macesker, the executive director at RDC.

"We're testing bio-diesel for our diesel driven vessels and bio-butanol as a replacement blending agent for ethanol in gasoline for marine applications," says Rich Hansen, Chief of the Surface Branch. "To support these efforts we have CRADAs with three marine engine manufacturers—Cummins, Mercury Marine, and Honda Americas— to conduct a multi-year project that includes materials compatibility testing, bench testing, field testing, and operational testing."

One of the Coast Guard's well known missions is search and rescue (SAR). RDC is looking at new knowledge and technology to improve SAR effectiveness, to include distress notification, search execution, object detection, and victim rescue. One of those efforts is focused on mass rescue operations specifically focusing on rescue and evacuation of large numbers of mari-

The Coast Guard is "military, multi-mission, and maritime," and responsible for maritime safety, maritime security, and maritime stewardship.

The Coast Guard has 11 statutory missions:

- Ports, waterways, and coastal security
- Drug interdiction
- Aids to navigation
- Search and rescue
- Living marine resources
- Marine safety
- Defense readiness
- Migrant interdiction
- Marine environmental protection
- Ice operations
- Other law enforcement

*(listed in order of percentage of operating expenses)*

*Cmdr. Rich Condit, of the Coast Guard Office of Boat Forces, and Chief Warrant Officer Mark Helmers, of the 17th Coast Guard District response division, watch a prototype amphibious vessel, developed by Tyler Rentals of Ketchikan, Alaska, while standing on an ice floe 10 miles off the coast of Barrow Aug. 13, 2012. Coast Guard Research and Development Center personnel initiated an evaluation of amphibious vessels in the Arctic to document challenges associated with operating craft in the extreme environment. U.S. Coast Guard photo by Petty Officer 3rd Class Grant DeVuyst.*

*Deepwater Horizon spill, and were able to show that the oil came from another source. The lab can also provide expert testimony in legal proceedings to enforce pollution laws and assist in prosecution.*

*PACIFIC OCEAN -- Petty Officer 3rd Class John Cartwright, a Coast Guard Cutter Stratton crewmember, releases the Unmanned Aircraft System (UAS) ScanEagle during a demonstration approximately 150 miles off the Pacific Coast, Aug. 12, 2012. The ScanEagle is being demonstrated as a proof of concept for future deployments of small UAS aboard the National Security Cutter fleet. These capabilities can provide persistent and efficient surveillance in support of all 11 Coast Guard Missions. U.S. Coast Guard photo by Petty Officer 2nd Class Luke Clayton.*

time casualties. The SAR Optimal Planning System (SAROPS) uses a sophisticated computer model to determine the best search area, method, pattern and duration.

"We have a project looking at search & rescue on ice that will provide detection probabilities of various search targets from USCG platforms to improve search planning," Hansen says.

The Department of Homeland Security and the Coast Guard are concerned with chemical, biological, radiological, nuclear, or explosive (CBRNE) threat. RDC's Weapons of Mass Destruction (WMD) Countermeasures project is assessing strategies, technologies and procedures for dealing with WMD incidents and field-testing WMD countermeasures equipment, gear, training, and decontamination procedures.

The center is involved in assessing new and emerging technologies to improve efficient, time relevant collection, analysis, and dissemination of data, information, and knowledge. According to Dr. Jack McCready, Chief of the C4ISR Branch, research is underway to improve sensor feeds from multiple, independent sources into a common operating picture (COP) at sector and district command centers. "We're looking at how we can use and adapt mobile technology and hardware devices, such as smartphones and tablets, to capitalize on their flexibility and mobility to create ad-hoc networks."

RDC is working with DHS S&T on many project fronts including mobile communications applications for First Responders, especially when an Incident Command System is established for incidents of national significance like the Deepwater Horizon oil spill or the future use of small unmanned aerial systems for maritime law enforcement.

Arsenault says "RDC is working on standardizing graphic information systems (GIS) displays. "Everybody in the Coast Guard enterprise would be able to use the same GIS picture and turn on and off different layers of information based on what information is valuable to that person and what information they actually are allowed to view."

When it comes to oil spills, the RDC is as concerned about incidents on the lakes and inland waterways as it is with those that occur along the coast and at sea. The challenges presented by the Great lakes when frozen can be as daunting as the Arctic.

The USCG is working with the Department of Interior's Bureau of Safety and Environmental Enforcement (BSEE) and oil and gas producers to better understand the challenges and impact of exploration and operation in cold weather and ice environments. Kurt A. Hansen, a research engineer in the environmental and waterways branch, says that the RDC is deploying existing as well as new equipment in the Great Lakes to evaluate their use in broken ice, something that both the Great Lakes and the summer Arctic Ocean have in common. While fresh water ice in the Great Lakes is different than multi-year ice in some parts of the Arctic, many of the new ice-edge properties are very similar. Current flow and ice

movement in the Great Lakes may also be similar to that in near-shore of the Arctic, but not for the offshore spills, which is out where vessels and drill ships tend to be. "Use of fire resistant booms, heated skimmers, self-propelled skimmers and methods to process and store the oil are being evaluated," he says. "The use of remotely operated vehicles (ROV) and autonomous underwater vehicles (UUV) are also being evaluated for use in detection."

As more water opens up in the Arctic, particularly in the summer, it's no surprise that the Coast Guard and RDC are examining how to best meet the unique challenges in the Arctic and extreme latitudes.

"We have a series of efforts supporting current and future research in the Arctic," says Rich Hansen. "We have conducted key studies and analyses to support Coast Guard decisions, including a High Latitude Study that resulted in the High Latitude Mission Analysis Report and Business Case Analysis on Polar Icebreaker options—repair, replace or lease—that was sent to Congress. We supported the Arctic Shield 2012 exercises, and will do so again this summer. We are conducting testing on the Coast Guard's use of a Navy experimental satellite for communications outside traditional high-frequency radio and satellite coverage zones. We are providing a subject matter expert to the planned exercise of the Spilled Oil Recovery System (SORS) exercise as well as documenting logistic challenges of that exercise. The RDC is collaborating with the U.S. Army Corps of Engineers, Engineer Research and Development Center's Cold Regions Research and Engineering Laboratory (CRREL) to assess anti-icing roadmap for the CG as it develops new capabilities for high latitude operations."

The Coast Guard lacks the infrastructure and assets necessary to maintain the same level of coverage and patrols in Alaska that is provided in other Coast Guard areas of responsibility. But the RDC is evaluating vehicles that might be optimized for Coast Guard missions along the Arctic coast. "We're looking for a craft that is capable of transiting through and over ice and ice-strewn water," said Rich Hansen. "We're also looking for shallow water capability, and the ability to operate in areas with minimal infrastructure. Ideally we would like to find something that could be flown in on Coast Guard aircraft in the event of an incident requiring our response."

The Coast Guard tested crafts developed by two companies, U.S. Arktos Developments of British Columbia, Canada, and Tyler Rentals/Amphib Alaska of Ketchikan, Alaska, as part of the 2012 Arctic Shied exercise. The 50-foot articulated Arktos craft features two tracked sections that can operate in the water, on land, and over ice. The boat-like 24-foot Tyler Rentals/Amphib Alaska craft features retractable amphibious tracks to allow transition from the water to cross the ice or beaches.

Rich Hansen says that maintaining maritime domain awareness is challenging, and much more so in the Arctic region. "You have all the challenges of obtaining situational awareness that you have off our lower 48 shoreline, then you pile on top of that all the lack of power and supporting infrastructure, extremely low temperatures where the air is much denser, so with high winds your wind loading is actually higher, per mile per hour than you would have in Miami, for example. Getting to your remote Automatic Identification System (AIS) or radio sites to do any maintenance is difficult, so you have to build in redundancy. And any platforms need to be built on raised platforms above the permafrost."

He also says that RDC and other research organizations are developing and evaluating new water-shedding paints and coatings for structures and vessels that help avoid ice build-up. "If the water doesn't adhere to the structure, it gives it time to drain before it freezes up."

RDC is constantly scanning the horizon for new technologies that can meet Coast Guard aviation, surface, C4ISR, environmental and other mission requirements. More information on RDC project high lights and current project portfolio can be found on http://www.uscg.mil/hq/cg9/rdc. Individuals or organizations interested in collaboration with RDC, or offering ideas or suggestions for evaluation should contact RDC Executive Director Bert Macesker at bert.n.macesker@uscg.mil.

If there is oil found in the water, the U. S. Coast Guard Marine Safety Laboratory (MSL) in New London, Conn., will help identify it. Although not part of the RDC, it is co-located with it. According to MSL manager Wayne Gronlund, the lab performs forensic oil analysis "fingerprinting," which is the "application of specific knowledge of petrochemicals and use of sophisticated analytical equipment and techniques to identify the source(s) of oil pollution."

Through a methodical chemical analysis, the lab can determine where oil came from, or sometimes just as important, where it didn't come from.

If the oil is the result of exploration activities-whether unintentional or intentional-the MSL can match the oil found to its source, which may establish culpability. "We have to prove it's their oil from that well," says Wayne Gronlund, manager of the MSL.

If the contamination comes from a vessel that leaks or discharges oily waste, the MSL's forensic process can identify the ship and even the tank where it came from.

The lab maintains an evidence locker containing thousands of hydrocarbon compound samples that can help with the identification process. It has been called upon to determine if certain samples taken from the Gulf were in fact from the Deepwater Horizon spill, and were able to show that the oil came from another source. The lab can also provide expert testimony in legal proceedings to enforce pollution laws and assist in prosecution.