Homeland Security

Science and Technology

Increasing U.S. Coast Guard Maritime Domain Awareness in the Arctic

A DHS Science and Technology Center of Excellence

Enhancing Maritime Safety in the Arctic

The Center for Maritime, Island and Remote and Extreme Environment Security, a Department of Homeland Security Science and Technology Center of Excellence, is working with the U.S. Coast Guard (USCG) to develop a suite of tools to monitor maritime activities and environmental conditions in the Arctic. These tools will enhance the ability of the USCG to more effectively carry out search and rescue missions, respond to environmental disasters, enforce the law, aid in scientific exploration, or provide assistance during other crises or emergencies.

USCG needs improved Maritime Domain Awareness (MDA) capabilities in the Arctic because human activity in the region is increasing as it becomes more accessible from melting and receding ice. There are greater numbers of commercial vessels, scientific explorations, and potential exploitation of resources. This increased activity requires USCG to have a larger and more active presence in the Arctic.

Research Goals

The MDA in the Arctic project's research goals include developing the following capabilities:

- Near real-time monitoring of offshore environmental conditions (e.g., sea ice, ocean current) for Barrow, Alaska.
- Low-bandwidth data fusion capabilities and informative, low-volume data products for faster dissemination of the common operating picture to first responders.
- Integration of data streams from surface-based sensors with remote sensing data to enable enhanced Arctic surveillance.

Partnerships

Several key stakeholders engage in the project including:

- USCG
- North Slope Borough, Alaska
- The oil and gas industry Bureau of Ocean Energy Management
- Arctic Slope Regional Corporation
- Alaska Department of Environmental Conservation
- Alaska Ocean Observing Network

Remote Power Module

Technologies and Tools Under Development

The suite of tools and technologies being developed and tested include:

- Remote Power Module for remotely powering sensors and communication systems in isolated and extreme environments using wind and solar power
- Satellite Imagery to monitor and track ice formations
- Unmanned Aircraft System (UAS) for radar and video reconnaissance missions to scan ice features

Bringing Fuel Safely to Nome, Alaska

Severe storms in November 2011 prevented the annual pre-winter delivery of fuel by barge to Nome, Alaska. Without this delivery, Nome was projected to run out of power in the Spring of 2012.

In early January 2012, data retrieved with the UAS helped the USCG Cutter Healy, the Nation's only operating polar ice breaker, navigate hazardous features and guide the Russian tanker barge, Renda, to a safe location to moor near Nome, enabling the delivery of much-needed heating oil to the small Alaskan city.