

DHS Science and Technology Directorate

International effort helps bolster Polar Icebreaker fleet

Office of Test and Evaluation facilitates Polar Icebreaker partnership between Coast Guard and Canada

America's Polar Icebreakers are aging, as polar ice is changing

The Coast Guard requires at least three new heavy icebreakers to ensure continued access to both Polar Regions and support the nation's economic, commercial, maritime and national security needs. The United States Coast Guard heavy polar icebreaking fleet includes two 399-foot heavy icebreakers, the Coast Guard Cutters (USCGC) *Polar Star* and *Polar Sea*—commissioned in 1976 and 1977.

After being placed in caretaker status as a cost-saving measure in 2006, the *Polar Star* underwent three years of repair and renovation for reactivation before it returned to operations in 2013. *Polar Star* is expected to remain in service through approximately 2020 to 2023. *Polar Sea* was deactivated in 2011.

The U.S. shipyard that designed and built those ships, Lockheed Shipbuilding, closed in 1988. The designers, engineers and maintenance professionals who first worked on the *Polar Star* and the *Polar Sea* as well as manufacturers of replacement parts needed to keep the cutters operational, are becoming harder to find, and increasing polar ice melt rates are making the Polar Regions more challenging to navigate.

Multi-mission platform

Designed for open-water icebreaking, both cutters feature reinforced hulls and specially angled bows. These polar icebreakers allow the United States to maintain defense readiness in the Arctic and Antarctic regions; enforce treaties and other laws that safeguard industry and the environment; provide port, waterway, and coastal security; and provide logistical support and vessel escort needed to move goods and personnel in support of scientific research, commerce, national security activities and maritime safety.

Capability Development Support facilitates Coast Guard/Canada test and evaluation effort

In January 2016, S&T CDS Office of Test and Evaluation initiated a test and evaluation initiative with the USCG Office of Acquisition and the National Research Council (NRC) Canada to support the presidentially mandated, accelerated development of a new Coast Guard Polar Icebreaker. Under the 2004 Agreement between the U.S. and Canada for Cooperation in Science and Technology, CDS/OTE coordinated plans and agreements that allow the

Coast Guard to share information with technical experts and use test resources at the NRC Ice Tank research facility in St. John's, Newfoundland, one of the world's largest ice tank facilities.

Information sharing saves time, reduces costs

The DHS S&T Cooperative Agreement with Defence Research and Development Canada (DRDC) allows the USCG to access key research, development, test and evaluation (RDT&E) information and test resources from Canadian icebreaker design experts to mitigate engineering performance risks of United States icebreaker designs. The tests include analyses of maneuverability in many kinds of ice conditions, icebreaking resistance, and powering. Information gained from the tests will help create baseline requirements for new heavy polar icebreakers, improve icebreaker design, and speed USCG acquisition of modern, maintainable icebreakers.



The National Research Council Canada Ice Tank Facility at St. John's, Newfoundland offers test and evaluation of model-scale ships in a wide range of ice conditions they encounter in the Polar Regions.

Testing

USCG finalized operational requirements for the new Polar Icebreaker in January 2016. Model-scale polar icebreaker testing activities formally commenced at the Ice Tank at St. John's in April and concluded in July 2017. Production of the next polar icebreaker is expected to begin in 2020, under an accelerated acquisition timeline.



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To learn more about the Polar Icebreaker test and evaluation partnership between the USCG and Canada, contact Gregory Simmons, Deputy Director for National Preparedness Programs, Office of Test and Evaluation, at STCDS@hq.dhs.gov.