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## **Fund icebreakers now**

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Congress last funded the purchase of polar icebreakers for the US Coast Guard in the early 1970s. The USCCG Polar Star (WAGB-10) was commissioned in 1976, followed by the USCGC Polar Sea (WAGB-11) in 1977. Polar Sea has been out of service since 2010 due to a major engine failure. Polar Star was 'in commission, special' status from 2008 through 2012 while undergoing a service life extension. It is currently the only active heavy polar icebreaker in the US fleet. The less capable USCGC Healy (WAGB-20) is a medium icebreaker and is equipped to support research missions in polar waters.

Polar Star is now 42 years of age. That is old for any ship, even one that has gone through a service life extension. Polar icebreakers operate in extreme conditions. Polar Star regularly uses its three 25,000 horsepower gas turbine engines to drive its 13,000 ton hull into pack ice. If the ice is thick and hard, and if there is little open water nearby, as is often the case, the icebreaker is brought to a halt in less than a ship-length. The officer of the deck reverses thrust before the icebreaker is fully halted, goes astern several hundred yards, and rams the ice again at full power. This process continues until the ice is broken and the ship can proceed. Even when the ice is thinner and the cutter can run continuously, the stresses on the hull, propellers, shafts, and engines are intense. This activity has been repeated over and over again for all but the four years of the service life extension.

On Polar Star's current deployment to the Antarctic in support of Operation Deep Freeze, a seal on one of its three shafts failed, causing flooding in the cutter's engine room at the rate of approximately 20 gallons per minute. An emergency shaft seal was installed and the engineering space was dewatered. Separately, one of the three gas turbine engines failed. The crew was able to troubleshoot the turbine finding a programming issue between the engine and the cutter's 1970s era electrical system. This year's US Antarctic Program resupply mission is now complete and Polar Star is enroute its homeport of Seattle.

Ideally, Congress would have commenced planning to fund new polar icebreakers soon after Polar Star and Polar Sea were commissioned. But that is no realistic. The US Coast Guard, though, has sought such funding for many years now. It has prepared plans and drafted rough requirements for consideration by its Service Secretaries, the Office of Management and Budget (OMB), and its authorizing and appropriations committees in the House and Senate.

The 1984 United States Polar Icebreaker Requirements Study, prepared jointly by the Coast Guard, Department of Transportation, Maritime Administration, Department of Defense, National Science Foundation, National Oceanic and Atmospheric Administration, and Office of Management and Budget, recommended that four polar icebreakers would be required to meet national and program requirements through the year 2000.

In 1990, an updated report to the President on polar icebreaker requirements reiterated that: “As instruments of national policy and presence, icebreakers are necessary to meet the legitimate needs of national defense and security, to demonstrate the full range of national sovereignty, and to protect economic interests and to fulfill scientific research requirements.” While data showed that at least four heavy icebreakers would be required, the report recommended funding for only two, based on budgetary forecasts.

The USCG Arctic Strategy (May 2013) noted that climatic conditions in the Arctic are changing rapidly, with a 40% reduction in the polar ice cap since 1970. Concomitantly, human activity in the Arctic is increasing rapidly. Merchant vessels, fishing vessels, passenger vessels, and oil and gas drilling rigs are becoming common sights in waters previously the almost exclusive domain of polar bears, walrus, and seals. This human activity will continue to increase regardless of whether the US government (and particularly the US Coast Guard) has a meaningful presence in the Arctic, but that human activity will be safer and more orderly if the Coast Guard is there to support maritime safety, security, and environmental protection.

In December 2016, the Department of Homeland Security (DHS) submitted a report to Congress entitled ‘Arctic Icebreaking Capabilities’. The report addressed the current ability of the Coast Guard to provide the Navy with adequate icebreaking capabilities to operate a surface combatant ship in the Arctic year round. It concludes that the Coast Guard is planning to acquire at least two new heavy icebreakers to recapitalize the existing fleet.

In July 2017, the National Academies of Sciences, Engineering, and Medicine recommended construction of four new polar icebreakers of the same design as the lowest cost strategy for protecting US interests in the Arctic and Antarctic. At an estimated cost of \$791 million each, four heavy icebreakers of common design would reduce operating and maintenance costs over the life of the vessels, improve continuity of service, increase the USCG’s icebreaking capability, and improve operational effectiveness.

A September 2017 report of the Government Accountability Office (GAO) noted that the Coast Guard has taken various actions to advance its heavy polar icebreaker acquisition program since establishing it in 2013, such as partnering with the Navy and engaging the shipbuilding industry, but faces risks in implementing its accelerated acquisition schedule. In particular, in October 2016, the Coast Guard released a notional schedule for the heavy polar acquisition program showing delivery of the first of three heavy polar icebreakers in fiscal year 2023—three years sooner than initially planned. However, Coast Guard officials reported that should acquisition planning documents, including acquisition and lifecycle cost estimates, not be

completed and approved by the end of fiscal year 2017, the program may not be able to meet its schedule for releasing the request for proposals for detail design and construction—a key step in the acquisition process—in mid-fiscal year 2018. This may then delay the contract award scheduled for fiscal year 2019 and extend the proposed delivery date.

Various responsibilities drive the Coast Guard's determination of its polar icebreaking mission requirements, and the Coast Guard has been unable to address all polar icebreaking requests since 2010. In accordance with statute and presidential and national security directives, the Coast Guard has an obligation to maintain the capability to conduct polar ice operations. Coast Guard polar icebreakers do so by providing a scientific research platform for National Science Foundation (NSF) and other federal agencies and enforcing U.S. laws and international treaty obligations in the Polar Regions. For example, to support the U.S. Antarctic program and NSF for national science missions, the Coast Guard provides reimbursable icebreaking services for the annual resupply of McMurdo Research Station. However, the Coast Guard reports that it has been unable to address all agency requests for its polar icebreaking services. For example, the Coast Guard is often requested to provide polar icebreaking services for other US government agency operations, and tracks its performance in meeting these requests. Specifically, the Coast Guard reported fulfilling 78 percent (25 of 32) of agency requests for polar icebreaking services during fiscal years 2010 through 2016.

In February 2017, the Coast Guard awarded five firm fixed-price contracts for heavy polar icebreaker design studies and analysis. The objective of the studies is to identify design and systems approaches to reduce acquisition cost and production timelines. In April 2017, the Coast Guard released its draft heavy polar icebreaker system specifications in a request for information (RFI). The RFI seeks questions, comments, and feedback related to heavy polar icebreaker technology risks, sustainability, productivity, and affordability.

The Administration has now requested that Congress appropriate \$750 million in fiscal year 2018 for detail work, design, and construction of a new heavy polar icebreaker. There is still work to be done before steel can be cut, but it is time for Congress to step forward and commit itself to acquisition of the needed heavy polar icebreakers. It is recommended that Congress appropriate the necessary funds now. Reasonable conditions can and should be placed on expenditure of those funds to minimize financial risks. But, without adequate money on the table, US ship builders will not exert best efforts to bring this urgent need to fruition.