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Coast Guard Polar Icebreaker Modernization: Background and Issues for Congress

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Summary

The Coast Guard's proposed FY2017 budget requests $150 million in acquisition funding for a new polar icebreaker that the Coast Guard wants to begin building in FY2020. The total acquisition cost of the ship might be roughly $1 billion, including design costs. The project to acquire a new polar icebreaker was initiated in Coast Guard's FY2013 budget submission. The project has received about $15.6 million in acquisition funding through FY2016. The $150 million requested for FY2017 is the first major increment of acquisition funding requested for the ship, and would fund planning design activities required to begin production of the ship in FY2020.

Coast Guard polar icebreakers perform a variety of missions supporting U.S. interests in polar regions. A Department of Homeland Security (DHS) Mission Need Statement (MNS) approved in June 2013 states that "current requirements and future projections ... indicate the Coast Guard will need to expand its icebreaking capacity, potentially requiring a fleet of up to six icebreakers (3 heavy and 3 medium) to adequately meet mission demands in the high latitudes.... "

The operational U.S. polar icebreaking fleet currently consists of one heavy polar icebreaker, *Polar Star*, and one medium polar icebreaker, *Healy*. In addition to *Polar Star*, the Coast Guard has a second heavy polar icebreaker, *Polar Sea*. This ship suffered an engine casualty in June 2010 and has been non-operational since then. *Polar Star* and *Polar Sea* entered service in 1976 and 1978, respectively, and are now well beyond their originally intended 30-year service lives.

The current condition of the U.S. polar icebreaker fleet, the DHS MNS, and concerns among some observers about whether the United States is adequately investing in capabilities to carry out its responsibilities and defend its interests in the Arctic, have focused policymaker attention on the question of whether and when to acquire one or more new heavy polar icebreakers as replacements for *Polar Star* and *Polar Sea*.

On September 1, 2015, the White House issued a fact sheet in conjunction with a visit to Alaska by President Obama indicating that the Administration wants to begin building a new polar icebreaker in FY2020, and that the Administration will also "begin planning for construction of additional icebreakers" beyond the one that the Administration proposes to begin building in FY2020.

On January 13, 2016, the Coast Guard announced that it intended to hold an industry day for the polar icebreaker program, followed by one-on-one meetings between the Coast Guard and prospective shipbuilders and ship designers, as a part of the Coast Guard's ongoing market research for the program. The industry day was held on March 18, 2016, and the one-on-one meetings between the Coast Guard and industry officials were scheduled for March 28-31, with industry feedback to be submitted to the Coast Guard by April 5, 2016.

The Coast Guard's notional schedule for the program, which could change, shows a draft Request for Proposals (RFP) being released in the first quarter of FY2017, a final RFP being released in the fourth quarter of FY2017 or the first quarter of FY2018, Coast Guard evaluation of received proposals taking place from the third or fourth quarter of FY2018 through the third or fourth quarter of FY2019, a contract award being made in the third or fourth quarter of FY2019, and construction of the ship beginning in the third or fourth quarter of FY2019.

A polar icebreaker that begins construction in FY2020 might enter service in 2024 or 2025. *Polar Star* has been refurbished and reentered service in December 2012 for an intended period of 7 to 10 years—a period that will end between December 2019 and December 2022. The Coast Guard is examining the feasibility and potential cost effectiveness of either further extending the service

life of Polar Star or repairing Polar Sea and bringing it back into service, so as to bridge the time between the end of Polar Star's intended current 7- to 10-year operating period and the entry into service of a new polar icebreaker.

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Introduction

This report provides background information and issues for Congress on the sustainment and modernization of the Coast Guard's polar icebreaker fleet. The Coast Guard's proposed FY2017 budget requests $150 million in acquisition funding for a new polar icebreaker that the Coast Guard wants to begin building in FY2020.

The issue for Congress is whether to approve, reject, or modify the Administration's FY2017 acquisition funding request for a new polar icebreaker, and, more generally, whether to approve, reject, or modify the Coast Guard's overall plan for sustaining and modernizing the polar icebreaking fleet. Congress's decisions on this issue could affect Coast Guard funding requirements, the Coast Guard's ability to perform its polar missions, and the U.S. shipbuilding industrial base.

This report does not cover the icebreakers that the Coast Guard operates on the Great Lakes. A separate CRS report covers acquisition of general-purpose cutters for the Coast Guard.[1] Another CRS report provides an overview of various issues relating to the Arctic.[2]

Background

Overview of Issue

The Coast Guard's proposed FY2017 budget requests $150 million in acquisition funding for a new polar icebreaker that the Coast Guard wants to begin building in FY2020. The total acquisition cost of the ship might be roughly $1 billion, including design costs. The project to acquire a new polar icebreaker was initiated in Coast Guard's FY2013 budget submission. The project has received about $15.6 million in acquisition funding through FY2016. The $150 million requested for FY2017 is the first major increment of acquisition funding requested for the ship, and would fund planning design activities required to begin production of the ship in FY2020.

Coast Guard polar icebreakers perform a variety of missions supporting U.S. interests in polar regions. A Department of Homeland Security (DHS) Mission Need Statement (MNS) approved in June 2013 states that "current requirements and future projections ... indicate the Coast Guard will need to expand its icebreaking capacity, potentially requiring a fleet of up to six icebreakers (3 heavy and 3 medium) to adequately meet mission demands in the high latitudes.... "[3]

The operational U.S. polar icebreaking fleet currently consists of one heavy polar icebreaker, *Polar Star*, and one medium polar icebreaker, *Healy*. In addition to *Polar Star*, the Coast Guard has a second heavy polar icebreaker, *Polar Sea*. This ship suffered an engine casualty in June 2010 and has been non-operational since then. *Polar Star* and *Polar Sea* entered service in 1976 and 1978, respectively, and are now well beyond their originally intended 30-year service lives.

The current condition of the U.S. polar icebreaker fleet, the DHS MNS, and concerns among some observers about whether the United States is adequately investing in capabilities to carry

[1] CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by (name redacted) .

[2] CRS Report R41153, *Changes in the Arctic: Background and Issues for Congress*, coordinated by (name redacted) .

[3] Department of Homeland Security, *Polar Icebreaking Recapitalization Project Mission Need Statement, Version 1.0*, approved by DHS June 28, 2013, p. 9.

out its responsibilities and defend its interests in the Arctic, have focused policymaker attention on the question of whether and when to acquire one or more new heavy polar icebreakers as replacements for *Polar Star* and *Polar Sea*.

On September 1, 2015, the White House issued a fact sheet in conjunction with a visit to Alaska by President Obama indicating that the Administration wants to begin building a new polar icebreaker in FY2020, and that the Administration will also "begin planning for construction of additional icebreakers" beyond the one that the Administration proposes to begin building in FY2020.[4]

On January 13, 2016, the Coast Guard announced that it intended to hold an industry day for the polar icebreaker program, followed by one-on-one meetings between the Coast Guard and prospective shipbuilders and ship designers, as a part of the Coast Guard's ongoing market research for the program.[5] The industry day was held on March 18, 2016, and the one-on-one meetings between the Coast Guard and industry officials were scheduled for March 28-31, with industry feedback to be submitted to the Coast Guard by April 5, 2016.[6]

The Coast Guard's notional schedule for the program, which could change, shows a draft Request for Proposals (RFP) being released in the first quarter of FY2017, a final RFP being released in the fourth quarter of FY2017 or the first quarter of FY2018, Coast Guard evaluation of received proposals taking place from the third or fourth quarter of FY2018 through the third or fourth quarter of FY2019, a contract award being made in the third or fourth quarter of FY2019, and construction of the ship beginning in the third or fourth quarter of FY2019.[7]

A polar icebreaker that begins construction in FY2020 might enter service in 2024 or 2025. *Polar Star* has been refurbished and reentered service in December 2012 for an intended period of 7 to 10 years—a period that will end between December 2019 and December 2022. The Coast Guard is examining the feasibility and potential cost effectiveness of either further extending the service life of *Polar Star* or repairing *Polar Sea* and bringing it back into service, so as to bridge the time between the end of *Polar Star's* intended current 7- to 10-year operating period and the entry into service of a new polar icebreaker.

Missions of U.S. Polar Icebreakers

U.S. polar ice operations support 9 of the Coast Guard's 11 statutory missions.[8] The roles of U.S. polar icebreakers can be summarized as follows:

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[4] The White House, "FACT SHEET: President Obama Announces New Investments to Enhance Safety and Security in the Changing Arctic," September 1, 2015, accessed September 2, 2015, at https://www.whitehouse.gov/the-press-office/2015/09/01/fact-sheet-president-obama-announces-new-investments-enhance-safety-and.

[5] "USCG Polar Class Icebreaker Replacement Program," accessed January 15, 2016, at https://www.fbo.gov/index?s=opportunity&mode=form&id=a778c49349c443d2658666e19cc100e9&tab=core&tabmode=list&=.

[6] "Heavy Polar Icebreaker Industry Engagement Activities," accessed April 4, 2016, at http://www.uscg.mil/ACQUISITION/icebreaker/Industry_Day_031816.asp.

[7] Coast Guard polar icebreaker program industry day briefing entitled "Polar Icebreaker (PIB) Acquisition Program Industry Engagement," slide 14, accessed April 4, 2016, at http://www.uscg.mil/ACQUISITION/icebreaker/pdf/Industry%20Day%2018%20March%202016.pdf.

[8] The nine missions supported by polar ice operations are search and rescue; maritime safety; aids to navigation; ice operations; marine environmental protection; living marine resources; other law enforcement (protect the exclusive economic zone [EEZ]); ports, waterways and costal security; and defense readiness. The two missions not supported by polar ice operations are illegal drug interdiction and undocumented migrant interdiction. (Department of Homeland Security, *Polar Icebreaking Recapitalization Project Mission Need Statement, Version 1.0*, approved by DHS June 28, 2013, p. 10.)

- conducting and supporting scientific research in the Arctic and Antarctic;
- defending U.S. sovereignty in the Arctic by helping to maintain a U.S. presence in U.S. territorial waters in the region;
- defending other U.S. interests in polar regions, including economic interests in waters that are within the U.S. exclusive economic zone (EEZ) north of Alaska;
- monitoring sea traffic in the Arctic, including ships bound for the United States; and
- conducting other typical Coast Guard missions (such as search and rescue, law enforcement, and protection of marine resources) in Arctic waters, including U.S. territorial waters north of Alaska.

Operations to support National Science Foundation (NSF) research activities in the Arctic and Antarctic have accounted in the past for a significant portion of U.S. polar icebreaker operations.[9] Supporting NSF research in the Antarctic has included performing an annual mission, called Operation Deep Freeze, to break through the Antarctic ice so as to resupply McMurdo Station, the large U.S. Antarctic research station located on the shore of McMurdo Sound, near the Ross Ice Shelf.

Although polar ice is diminishing due to climate change, observers generally expect that this development will not eliminate the need for U.S. polar icebreakers, and in some respects might increase mission demands for them. Even with the diminishment of polar ice, there are still significant ice-covered areas in the polar regions. Diminishment of polar ice could lead in coming years to increased commercial ship, cruise ship, and naval surface ship operations, as well as increased exploration for oil and other resources, in the Arctic—activities that could require increased levels of support from polar icebreakers.[10] Changing ice conditions in Antarctic waters have made the McMurdo resupply mission more challenging since 2000.[11]

The Coast Guard's strategy document for the Arctic region, released on May 21, 2013, states that "The United States must have adequate icebreaking capability to support research that advances fundamental understanding of the region and its evolution," and that "The Nation must also make a strategic investment in icebreaking capability to enable access to the high latitudes over the long-term."[12]

Current U.S. Polar Icebreakers

The U.S. polar icebreaker fleet currently includes four ships—three Coast Guard ships and one ship operated by the NSF. The ships are described briefly below.

[9] This passage, beginning with "The roles of…", originated in an earlier iteration of this CRS report and was later transferred by GAO with minor changes to Government Accountability Office, *Coast Guard[:]Efforts to Identify Arctic Requirements Are Ongoing, but More Communication about Agency Planning Efforts Would Be Beneficial*, GAO-10-870, September 2010, p. 53.

[10] For more on changes in the Arctic due to diminishment of Arctic ice, see CRS Report R41153, *Changes in the Arctic: Background and Issues for Congress*, coordinated by (name redacted) .

[11] National Research Council, *Polar Icebreakers in a Changing World, An Assessment of U.S. Needs*, Washington, 2007, pp. 6-7, 14, 63.

[12] *United States Coast Guard Arctic Strategy*, Washington, May 2013, p. 35; accessed May 24, 2013, at http://www.uscg.mil/seniorleadership/DOCS/CG_Arctic_Strategy.pdf.

Three Coast Guard Ships

The Coast Guard's three polar icebreakers—*Polar Star*, *Polar Sea*, and *Healy*—are multimission ships that can break through ice, support scientific research operations, and perform other missions typically performed by Coast Guard ships.

Heavy Polar Icebreakers Polar Star and Polar Sea

Polar Star (WAGB-10) and *Polar Sea* (WAGB-11),[13] sister ships built to the same general design (**Figure 1** and **Figure 2**), were acquired in the early 1970s as replacements for earlier U.S. icebreakers. They were designed for 30-year service lives, and were built by Lockheed Shipbuilding of Seattle, WA, a division of Lockheed that also built ships for the U.S. Navy, but which exited the shipbuilding business in the late 1980s.

Figure 1. *Polar Star* and *Polar Sea*

(Side by side in McMurdo Sound, Antarctica)

Source: Coast Guard photo accessed at http://www.uscg.mil/pacarea/cgcpolarsea/history.asp on April 21, 2011.

The ships are 399 feet long and displace about 13,200 tons.[14] They are among the world's most powerful non-nuclear-powered icebreakers, with a capability to break through ice up to 6 feet

[13] The designation WAGB means Coast Guard icebreaker. More specifically, W means Coast Guard ship, A means auxiliary, G means miscellaneous purpose, and B means icebreaker.

[14] By comparison, the Coast Guard's new National Security Cutters—its new high-endurance cutters—are about 418 feet long and displace roughly 4,000 tons.

thick at a speed of 3 knots. Because of their icebreaking capability, they are considered heavy polar icebreakers. In addition to a crew of 134, each ship can embark a scientific research staff of 32 people.

Figure 2. *Polar Sea*

Source: Coast Guard photo accessed at http://www.uscg.mil/pacarea/cgcpolarsea/img/PSEApics/FullShip2.jpg on April 21, 2011.

Polar Star was commissioned into service on January 19, 1976, and consequently is now several years beyond its intended 30-year service life. Due to worn out electric motors and other problems, the Coast Guard placed the ship in caretaker status on July 1, 2006.[15] Congress in FY2009 and FY2010 provided funding to repair *Polar Star* and return it to service for 7 to 10 years; the repair work, which reportedly cost about $57 million, was completed, and the ship was reactivated on December 14, 2012.[16] Although the repair work on the ship was intended to give it another 7 to 10 years of service, an August 30, 2010, press report quoted then-Commandant of the Coast Guard, Admiral Robert Papp, as saying, "We're getting her back into service, but it's a little uncertain to me how many more years we can get out of her in her current condition, even after we do the engine repairs."[17]

Polar Sea was commissioned into service on February 23, 1978, and consequently is also several years beyond its originally intended 30-year service life. In 2006, the Coast Guard completed a rehabilitation project that extended the ship's expected service life to 2014. On June 25, 2010, however, the Coast Guard announced that *Polar Sea* had suffered an engine casualty, and the ship was unavailable for operation after that.[18] The Coast Guard placed *Polar Sea* in commissioned,

[15] Source for July 1, 2006, date: U.S. Coast Guard email to CRS on February 22, 2008. The Coast Guard's official term for caretaker status is "In Commission, Special."

[16] See, for example, Kyung M. Song, "Icebreaker Polar Star Gets $57 Million Overhaul," *Seattle Times*, December 14, 2012.

[17] Cid Standifer, "Papp: Refurbished Icebreaker Hulls Could Last 'An Awful Long Time,'" *Inside the Navy*, August 30, 2010.

[18] On June 25, 2010, the Coast Guard announced that

> POLAR SEA suffered an unexpected engine casualty and will be unable to deploy on its scheduled fall 2010 Arctic patrol and may be unavailable for Operation Deep Freeze [the annual mission to

(continued...)

inactive status on October 14, 2011. The Coast Guard transferred certain major equipment from *Polar Sea* to *Polar Star* to facilitate *Polar Star*'s return to service.[19]

Section 222 of the Coast Guard and Maritime Transportation Act of 2012 (H.R. 2838/P.L. 112-213 of December 20, 2012) prohibited the Coast Guard from removing any part of *Polar Sea* and from transferring, relinquishing ownership of, dismantling, or recycling the ship until it submitted a business case analysis of the options for and costs of reactivating the ship and extending its service life to at least September 30, 2022, so as to maintain U.S. polar icebreaking capabilities and fulfill the Coast Guard's high latitude mission needs, as identified in the Coast Guard's July 2010 High Latitude Study. (The business case analysis was submitted to Congress with a cover date of November 7, 2013.)

Medium Polar Icebreaker Healy

Healy (WAGB-20) (**Figure 3**) was acquired in the early 1990s as a complement to *Polar Star* and *Polar Sea*, and was commissioned into service on August 21, 2000. The ship was built by Avondale Industries, a shipyard located near New Orleans, LA, that built numerous Coast Guard and Navy ships, and which eventually became part of Huntington Ingalls Industries (HII).[20] HII in recent years has wound down shipbuilding activities at Avondale; the facility is no longer building ships.[21]

Healy is a bit larger than *Polar Star* and *Polar Sea*—it is 420 feet long and displaces about 16,000 tons. Compared to *Polar Star* and *Polar Sea*, *Healy* has less icebreaking capability (it is considered a medium polar icebreaker), but more capability for supporting scientific research. The ship can break through ice up to 4½ feet thick at a speed of 3 knots, and embark a scientific research staff of 35 (with room for another 15 surge personnel and 2 visitors). The ship is used primarily for supporting scientific research in the Arctic.

(...continued)

> break through the Antarctic ice so as to resupply McMurdo Station], Dec. 20 to Jan 2, 2011.
>
> POLAR SEA will likely be in a maintenance status and unavailable for operation until at least January 2011….
>
> Currently, the 420-foot CGC HEALY, commissioned in 1999, is the service's sole operational polar region icebreaker. While the HEALY is capable of supporting a wide range of Coast Guard missions in the polar regions, it is a medium icebreaker capable of breaking ice up to 4.5-feet thick at three knots.
>
> The impact on POLAR SEA's scheduled 2011 Arctic winter science deployment, scheduled for Jan. 3 to Feb. 23, 2011, is not yet known and depends on the scope of required engine repair.
>
> ("Icebreaker POLAR SEA Sidelined By Engine Troubles," *Coast Guard Compass (Official Blog of the U.S. Coast Guard)*, June 25, 2010.)

A June 25, 2010, report stated that "inspections of the Polar Sea's main diesel engines revealed excessive wear in 33 cylinder assemblies. The Coast Guard is investigating the root cause and hopes to have an answer by August." ("USCG Cancels Polar Icebreaker's Fall Deployment," *DefenseNews.com*, June 25, 2010.) Another June 25 report stated that "five of [the ship's] six mighty engines are stilled, some with worn pistons essentially welded to their sleeves." (Andrew C. Revkin, "America's Heavy Icebreakers Are Both Broken Down," *Dot Earth (New York Times blog)*, June 25, 2010.)

[19] Source: October 17, 2011, email to CRS from Coast Guard Congressional Affairs office.

[20] HII was previously owned by Northrop Grumman, during which time it was known as Northrop Grumman Shipbuilding.

[21] See, for example, Marc Selinger, "Avondale Shipyard's Fate Remains Unclear," *Defense Daily*, April 21, 2015: 5.

Figure 3. *Healy*

Source: Coast Guard photo accessed at http://www.uscg.mil/history/webcutters/Healy_CGC_1_300.jpg on April 21, 2011.

One National Science Foundation Ship

The nation's fourth polar icebreaker is *Nathaniel B. Palmer*, which was built for the NSF in 1992 by North American Shipbuilding, of Larose, LA. The ship, called *Palmer* for short, is owned by Offshore Service Vessels LLC, operated by Edison Chouest Offshore (ECO) of Galliano, LA (a firm that owns and operates research ships and offshore deepwater service ships),[22] and chartered by the NSF. *Palmer* is considerably smaller than the Coast Guard's three polar icebreakers—it is 308 feet long and has a displacement of about 6,500 tons. It is operated by a crew of about 22, and can embark a scientific staff of 27 to 37.[23]

Unlike the Coast Guard's three polar icebreakers, which are multimission ships, *Palmer* was purpose-built as a single-mission ship for conducting and supporting scientific research in the Antarctic. It has less icebreaking capability than the Coast Guard's polar icebreakers, being capable of breaking ice up to 3 feet thick at speeds of 3 knots. This capability is sufficient for breaking through the more benign ice conditions found in the vicinity of the Antarctic Peninsula, so as to resupply Palmer Station, a U.S. research station on the peninsula. Some observers might

[22] For more on ECO, see the firm's website at http://www.chouest.com/.

[23] Sources vary on the exact number of scientific staff that can be embarked on *Palmer*. For some basic information on the ship, see http://www.nsf.gov/od/opp/support/nathpalm.jsp,

http://www.usap.gov/vesselScienceAndOperations/documents/prvnews_june03.pdfprvnews_june03.pdf,

http://nsf.gov/od/opp/antarct/treaty/pdf/plans0607/15plan07.pdf,

http://www.nsf.gov/pubs/1996/nsf9693/fls.htm, and

http://www.hazegray.org/worldnav/usa/nsf.htm.

view *Palmer* not so much as an icebreaker as an oceanographic research ship with enough icebreaking capability for the Antarctic Peninsula. *Palmer's* icebreaking capability is not considered sufficient to perform the McMurdo resupply mission.

Summary

In summary, the U.S. polar icebreaking fleet currently includes

- two heavy polar icebreakers (*Polar Star* and *Polar Sea*), one of which is operational, that are designed to perform missions in either polar area, including the challenging McMurdo resupply mission;
- one medium polar icebreaker (*Healy*) that is used primarily for scientific research in the Arctic; and
- one ship (*Palmer*) that is used for scientific research in the Antarctic.

Table 1 summarizes the four ships.

Table 1. U.S. Polar Icebreakers

	Polar Star	*Polar Sea*	*Healy*	*Palmer*
Operator	USCG	USCG	USCG	NSF
U.S.-Government owned?	Yes	Yes	Yes	No[a]
Currently operational?	Yes (reactivated on December 14, 2012)	No	Yes	Yes
Entered service	1976	1978	2000	1992
Length (feet)	399	399	420	308
Displacement (tons)	13,200	13,200	16,000	6,500
Icebreaking capability at 3 knots (ice thickness in feet)	6 feet	6 feet	4.5 feet	3 feet
Icebreaking capability using back and ram (ice thickness in feet)	21 feet	21 feet	8 feet	n/a
Operating temperature	-60° Fahrenheit	-60° Fahrenheit	-50° Fahrenheit	n/a
Crew (when operational)	155[b]	155[b]	85[c]	22
Additional scientific staff	32	32	35[d]	27-37

Sources: Prepared by CRS using data from U.S. Coast Guard, National Research Council, National Science Foundation, Department of Homeland Security (DHS) Office of Inspector General, and (for *Palmer*) additional online reference sources. n/a is not available.

a. Owned by Edison Chouest Offshore (ECO) of Galliano, LA, and leased to NSF through Raytheon Polar Services Company (RPSC).

b. Includes 24 officers, 20 chief petty officers, 102 enlisted, and 9 in the aviation detachment.

c. Includes 19 officers, 12 chief petty officers, and 54 enlisted.

d. In addition to 85 crew members 85 and 35 scientists, the ship can accommodate another 15 surge personnel and 2 visitors.

In addition to the four ships shown in **Table 1**, a fifth U.S.-registered polar ship with icebreaking capability—the icebreaking anchor handling tug supply vessel *Aiviq*—is used by Royal Dutch Shell oil company to support oil exploration and drilling in Arctic waters off Alaska. The ship, which completed construction in 2012, is owned by ECO and chartered by Royal Dutch Shell. It is used primarily for towing and laying anchors for drilling rigs, but is also equipped for responding to oil spills.

Required Numbers of U.S. Polar Icebreakers

June 2013 DHS Polar Icebreaker Mission Need Statement

The Department of Homeland Security (DHS) in June 2013 approved a Mission Need Statement (MNS) for the polar icebreaker recapitalization project. The MNS states (emphasis added):

> This Mission Need Statement (MNS) establishes the need for polar icebreaker capabilities provided by the Coast Guard, to ensure that it can meet current and future mission requirements in the polar regions....
>
> Polar Ice Operations support nine of the eleven authorized [i.e., statutory] Coast Guard missions....[24]
>
> **Current requirements and future projections based upon cutter demand modeling, as detailed in the HLMAR [High Latitude Mission Analysis Report], indicate the Coast Guard will need to expand its icebreaking capacity, potentially requiring a fleet of up to six icebreakers (3 heavy and 3 medium) to adequately meet mission demands in the high latitudes**.... The analysis took into account both the Coast Guard statutory mission requirements and additional requirements for year-round presence in both polar regions detailed in the Naval Operations Concept (NOC) 2010. The NOC describes when, where, and how U.S. naval forces will contribute to enhancing security, preventing conflict, and prevailing in war. The analysis also evaluated employing single and multi-crewing concepts. Baseline employment standards for single and multi-crew concepts used 185 DAFHP and 250/280 DAFHP, respectively. Strategic home porting analysis based upon existing infrastructure and distance to operational areas provided the final input to determine icebreaker capacity demand....
>
> In response to the National guidance, the HLMAR was commissioned that identified capability gaps in the Coast Guard's ability to support and conduct required missions in the polar regions. Nine of the Coast Guard's eleven authorized mission programs are conducted in the high latitudes. These directly support the 2012 Department of Homeland Security Strategic Plan as well as twelve of the 22 goals and objectives stated in the *Quadrennial Homeland Security Review (QHSR) Report: A Strategic Framework for a Secure Homeland, February 2010* and the *U.S. Department of Homeland Security Annual Performance Report, Fiscal Years 2010 – 2012*....
>
> ... numerous agencies of the Federal Government have an obligation to conduct polar ice operations to meet the requirements mandated by treaties, statutes, and executive direction....
>
> Without recapitalizing the Nation's polar icebreaking capability, the gap between the mission demand and icebreaking capacity and capability will continue to grow. Given the most optimistic scenarios, this gap will grow as the existing fleet ages beyond the vessels' designed service lives and unscheduled maintenance diminishes the assets' operational availabilities. Even with straightline demand, the current polar icebreaker fleet will not be sufficient to meet projected mission demands. The Coast Guard will be unable to meet either the current and projected Coast Guard and Federal agency mission demands or the goals for the QHSR in the high latitudes. Disapproval of the polar

[24] The nine missions supported by polar ice operations are search and rescue; maritime safety; aids to navigation; ice operations; marine environmental protection; living marine resources; other law enforcement (protect the exclusive economic zone [EEZ]); ports, waterways and costal security; and defense readiness. The two missions not supported by polar ice operations are illegal drug interdiction and undocumented migrant interdiction. (Department of Homeland Security, *Polar Icebreaking Recapitalization Project Mission Need Statement, Version 1.0*, approved by DHS June 28, 2013, p. 10.)

> icebreaker project will further challenge the agencies responsible for maintaining an active and influential United States presence in the polar regions.[25]

A number of studies have been conducted in recent years to assess U.S. requirements for polar icebreakers and options for sustaining and modernizing the Coast Guard's polar icebreaker fleet. The findings of some of these studies are presented in the **Appendix A**.

January 2014 Implementation Plan for National Strategy for Arctic Region

On May 10, 2013, the Obama Administration released a document entitled *National Strategy for the Arctic Region*.[26] On January 30, 2014, the Obama Administration released an implementation plan for this strategy.[27] Of the 36 or so specific initiatives in the implementation plan, one is entitled "Sustain federal capability to conduct maritime operations in ice-impacted waters." The implementation plan states the following regarding this initiative:

> *Objective:* Ensure the United States maintains icebreaking and ice-strengthened ship capability with sufficient capacity to project a sovereign U.S. maritime presence, support U.S. interests in the Polar Regions and facilitate research that advances the fundamental understanding of the Arctic.
>
> *Next Steps:* The Federal Government requires the ability to conduct operations in ice-impacted waters in the Arctic. As maritime activity in the Arctic region increases, expanded access will be required. Next steps include:
>
> • The lead and supporting Departments and Agencies will develop a document that lists the capabilities needed to operate in ice-impacted waters to support Federal activities in the Polar Regions and emergent sovereign responsibilities over the next ten to twenty years by the end of 2014.
>
> • Develop long-term plans to sustain Federal capability to physically access the Arctic with sufficient capacity to support U.S. interests by the end of 2017.
>
> *Measuring Progress:* Sustaining federal capability will be demonstrated through the Federal Government's ability to conduct operations in the Arctic to support statutory missions and sovereign responsibilities, and to advance interests in the region. Progress in implementing this objective will be measured by completion of the capabilities document, and long term sustainment plan.
>
> *Lead Agency:* Department of Homeland Security
>
> *Supporting Agencies:* Department of Commerce (National Oceanic and Atmospheric Administration), Department of Defense, Department of State, Department of Transportation, National Science Foundation[.][28]

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[25] Department of Homeland Security, *Polar Icebreaking Recapitalization Project Mission Need Statement, Version 1.0*, approved by DHS June 28, 2013, pp. 1, 2, 9, 10, 11, 12.

[26] *National Strategy for the Arctic Region*, May 2013, 11 pp.; accessed May 14, 2013, at http://www.whitehouse.gov/sites/default/files/docs/nat_arctic_strategy.pdf. The document includes a cover letter from President Obama dated May 10, 2013.

[27] The White House news release about the release of the implementation plan was posted at http://www.whitehouse.gov/blog/2014/01/30/white-house-releases-implementation-plan-national-strategy-arctic-region. The document is posted at http://www.whitehouse.gov/sites/default/files/docs/implementation_plan_for_the_national_strategy_for_the_arctic_region_-_fi....pdf.

[28] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, pp. 8-9.

November 2015 Coast Guard Testimony

At a November 17, 2015, hearing before the Europe, Eurasia, and Emerging Threats subcommittee and the Western Hemisphere subcommittee of the House Foreign Affairs Committee, Vice Admiral Charles Michel, the Vice Commandant of the Coast Guard, stated in his prepared statement that "Polar icebreakers are critical to supporting key national priorities laid out in the National Security Presidential Directive on Arctic Region policy and the National Strategy for the Arctic Region."[29] During the discussion portion of the hearing, Michel testified that the "Coast Guard needs at least two heavy icebreakers to provide year-round assured access and self-rescueability in the polar regions."[30]

Polar Icebreakers Operated by Other Countries

In discussions of U.S. polar icebreakers, some observers note the size of the polar icebreaking fleets operated by other countries. Countries with interests in the polar regions have differing requirements for polar icebreakers, depending on the nature and extent of their polar activities. **Table 2** shows a Coast Guard summary of major icebreakers around the world; the figures in the table include some icebreakers designed for use in the Baltic Sea.

Cost Estimates for Certain Polar Icebreaker Modernization Options

New Replacement Ships

The Coast Guard estimated in February 2008 that the acquisition of new replacement ships for the *Polar Star* and *Polar Sea* might cost between $800 million and $925 million per ship in 2008 dollars.[31] The Coast Guard said that this estimate

> is based on a ship with integrated electric drive, three propellers, and a combined diesel and gas (electric) propulsion plant. The icebreaking capability would be equivalent to the POLAR Class Icebreakers [i.e., Polar Star and Polar Sea] and research facilities and accommodations equivalent to HEALY. This cost includes all shipyard and government project costs. Total time to procure a new icebreaker [including mission analysis, studies, design, contract award, and construction] is eight to ten years.[32]

The Coast Guard further stated that this notional new ship would be designed for a 30-year service life.

The High Latitude Study provided to Congress in July 2011 states that the above figure of $800 million to $925 million in 2008 dollars equates to $900 million to $1,041 million in 2012 dollars.

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[29] Testimony of Vice Admiral Charles D. Michel, Vice Commandant, U.S. Coast Guard, on "Arctic Operations" Before the House Foreign Affairs Committee—Western Hemisphere & Europe, Eurasia, and Emerging Threats Subcommittees, November 17, 2015, p. 3.

[30] Transcript of hearing.

[31] Coast Guard point paper provided to CRS on February 12, 2008, and dated with the same date, providing answers to questions from CRS concerning polar icebreaker modernization.

[32] The Coast Guard states further that the estimate is based on the acquisition cost of the *Mackinaw* (WAGB-30), a Great Lakes icebreaker that was acquired a few years ago and commissioned into service with the Coast Guard in June 2006. The *Mackinaw* is 240 feet long, displaces 3,500 tons, and can break ice up to 2 feet, 8 inches thick at speeds of 3 knots, which is suitable for Great Lakes icebreaking. The Coast Guard says it scaled up the acquisition cost for the *Mackinaw* in proportion to the ship's size compared to that of a polar icebreaker and then adjusted the resulting figure to account for the above-described capabilities of the notional replacement ship and recent construction costs at U.S. Gulf Coast shipyards.

Table 2. Major Icebreakers Around the World

(as of May 21, 2015)

	Total all types, in inventory (+ under construction + planned)	In inventory, government owned or operated			In inventory, privately owned and operated		
		45,000 or more BHP	20,000 to 44,999 BHP	10,000 to 19,999 BHP	45,000 or more BHP	20,000 to 44,999 BHP	10,000 to 19,999 BHP
Russia	41 (+ 5 + 6)	6 (all nuclear powered; 4 operational)	6	7		13	9
Finland	7 (+ 0 +1)					6	1
Sweden	6		4				2
Canada	6 (+0 +1)		2	4			
United States	5 (+0 +1)	2 (*Polar Star* and *Polar* Sea—Polar *Sea* not operational)	1 (*Healy*)			1 (*Aiviq*—built for Shell Oil)	1 (*Palmer*)
Denmark	4						4
Estonia	2			2			
Norway	1 (+0 +1)			1			
Germany	1 (+0 +1)			1			
China	1 (+0 +1)			1			
Japan	1		1				
Australia	1			1			
Chile	1			1			
Latvia	1			1			
South Korea	1			1			
South Africa	1			1			
Argentina	1			1 (not operational)			

Source: Table prepared by CRS based on U.S. Coast Guard chart showing data compiled by the Coast Guard as of May 21, 2015, The table also lists the United Kingdom as planning one new polar research vessel.

Notes: Includes some icebreakers designed for use in the Baltic Sea. **BHP** = the brake horsepower of the ship's power plant. A ship with 45,000 or more BHP might be considered a heavy polar icebreaker, a ship with 20,000 to 44,999 BHP might be considered a medium polar icebreaker, and a ship with 10,000 to 19,999 BHP might be considered a light polar icebreaker or an ice-capable polar ship.

The study provides the following estimates, in 2012 dollars, of the acquisition costs for new polar icebreakers:

- $856 million for 1 ship;
- $1,663 million for 2 ships—an average of about $832 million each;
- $2,439 million for 3 ships—an average of $813 million each;
- $3,207 million for 4 ships—an average of about $802 million each;
- $3,961 million for 5 ships—an average of about $792 million each; and
- $4,704 million for 6 ships—an average of $784 million each.

The study refers to the above estimates as "rough order-of-magnitude costs" that "were developed as part of the Coast Guard's independent Polar Platform Business Case Analysis."[33]

25-Year Service Life Extensions

The Coast Guard stated in February 2008 that performing the extensive maintenance, repair, and modernization work needed to extend the service lives of *Polar Star* and *Polar Sea* by 25 years might cost roughly $400 million per ship. This figure, the Coast Guard said, is based on assessments made by independent contractors for the Coast Guard in 2004. The service life extension work, the Coast Guard said, would improve the two icebreakers' installed systems in certain areas. Although the work would be intended to permit the ships to operate for another 25 years, it would not return the cutters to new condition.[34]

An August 30, 2010, press report stated that the Commandant of the Coast Guard at the time, Admiral Robert Papp, estimated the cost of extending the lives of *Polar Star* and *Polar Sea* at about $500 million per ship; the article quoted Papp as stating that *Polar Star* and *Polar Sea* "were built to take a beating. They were built with very thick special steel, so you might be able to do a renovation on them and keep going…. I think there are certain types of steel that, if properly maintained, they can go on for an awful long time. What the limit is, I'm not sure."[35]

Reactivate *Polar Sea* for Several Years

At a June 26, 2013, hearing before the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee, Vice Admiral John P. Currier, the Vice Commandant of the Coast Guard, testified that repairing and reactivating *Polar Sea* for an additional 7 to 10 years of service would require about 3 years of repair work at a cost of about $100 million.[36]

As mentioned earlier, the business case analysis required by Section 222 of H.R. 2838/P.L. 112-213 was submitted to Congress with a cover date of November 7, 2013. The executive summary of the analysis states:

> **Findings:**
>
> A total of 43 mission critical systems in five general categories were assessed and assigned a condition rating. Overall, Propulsion, Auxiliary and Prime Mission Equipment are rated Poor to Fair, while Structure and Habitability are rated Fair to Good. POLAR SEA reactivation is estimated to cost $99.2 million (excluding annual operations and support costs) to provide 7-10 years of service to the Coast Guard. Given the age of the icebreaker, operations and support costs are projected to rise from $36.6 million in the first year of operation to $52.8 million in the tenth year of operation. Combining reactivation costs and point estimates for operating costs, reactivation would cost $573.9 million. Accounting for operational and technical uncertainties, using a 90% Confidence Level Risk Analysis, the total potential cost rises to $751.7 million.

[33] *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*, July 2010, p. 13.

[34] Coast Guard point paper provided to CRS on February 12, 2008, and dated with the same date, providing answers to questions from CRS concerning polar icebreaker modernization.

[35] Cid Standifer, "Papp: Refurbished Icebreaker Hulls Could Last 'An Awful Long Time,'" *Inside the Navy*, August 30, 2010. Ellipsis as in original.

[36] Transcript of hearing.

> Arctic seasonal icebreaking demands through 2022 can be met with existing and planned Coast Guard assets, as current requirements do not justify the need for heavy icebreaking capability in the Arctic. Heavy icebreaker capability is needed to perform Operation Deep Freeze in Antarctica, but Coast Guard assets may not be the only option available to the National Science Foundation to support this activity. Although a second heavy icebreaker would provide redundancy, the cost of this redundant capability would come at the expense of more pressing and immediate operational demands. POLAR STAR, when fully reactivated, will provide heavy icebreaker capability until a new icebreaker can be delivered to meet both current and emerging requirements.[37]

At a July 23, 2014, hearing before the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee, Vice Admiral Peter Neffenger, the Vice Commandant of the Coast Guard, testified that "as I understand it, that $100 million [estimate] was a snapshot in time if we were to have begun at that point to reactivate the vessel. We believe that there's been some additional deterioration [in the ship's condition] in the 2.5 years it's been sitting [at pier].... But I suspect that it will be something more than $100 million once we do the assessment [of the ship's condition]."[38]

In an interview published on September 26, 2015, Admiral Paul Zukunft, the Commandant of the Coast Guard, stated:

> One course of action is to reactivate an even older ship, the Polar Sea, and we're doing an assessment on that to see what would it take to reactivate it. So we'll make that decision next year. So there's always this cut to the chase, how much is it going to cost?
>
> This is a ship that's been laid up now for five years, parts were cannibalized in order to get the Polar Star running, it hasn't had a crew on it for that same amount of time as well. So it's like an old car that's been laid up without an engine in it, an engine that's been stripped of its parts. It's not until you really tear into it, and what you maybe thought you could do for $100 million is now $200, is now $300, $400 and you reach a point where you keep throwing good money after bad. You step back and say, well if it was a car, you should've bought a new car instead.
>
> The other part to look at with these old icebreakers is if they don't meet today's MARPOL code [a regulation to limit accidental or operational pollution from ships] for environmental compliance. If we are setting the standards, we the United State Coast Guard, ship-going standards to operate in the Arctic under that polar code, then by golly we ought to be in compliance as well and not in violation. So as we look at new construction, we want to make sure we're in compliance with modern day environmental standards up there as well.

When asked by the interviewer, as a follow-up question, whether he has "any idea of costs for reactivating the Polar Sea," Zukunft replied:

> That's why we're doing this full assessment, but we should know probably within a year from now, and what that will provide us is a floor. It will cost not less than, and I would never give an exact amount because it's not until you tear into this with an old ship in trying to find new parts and the like, those costs in all likelihood will grow over time.[39]

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[37] U.S. Coast Guard, *USCGC POLAR SEA Business Case Analysis, 2103 Report to Congress*, November 7, 2013, p. 4. The report was accessed April 9, 2014, at http://assets.fiercemarkets.net/public/sites/govit/polarsea_businesscaseanalysis_nov2013.pdf. See also "Second Heavy Icebreaker Not Necessary Through 2022, Says Coast Guard," Fierce Homeland Security (http://www.fiercehomelandsecurity.com), January 19, 2014, which includes a link to the assets.fiercemarkets.net site at which the report was posted.

[38] Transcript of hearing.

[39] Jacqueline Klimas, "Interview: Adm. Paul Zukunft, Coast Guard Commandant," *Washington Examiner*, September (continued...)

Coast Guard Polar Icebreaker Program

Overview

The Coast Guard's proposed FY2017 budget requests $150 million in acquisition funding for a new polar icebreaker that the Coast Guard wants to begin building in FY2020. The total acquisition cost of the ship might be roughly $1 billion, including design costs. The project to acquire a new polar icebreaker was initiated in the Coast Guard's FY2013 budget submission. The project has received about $15.6 million in acquisition funding through FY2016, including $7.609 million in FY2013, $2.0 million in FY2014, zero in FY2015, and $6.0 million in FY2016. The $150 million requested for FY2017 is the first major increment of acquisition funding requested for the ship and would fund planning design activities required to begin production of the ship in FY2020.

Desired Capabilities for New Polar Icebreaker

The Coast Guard's key performance parameters (KPPs) for a new polar icebreaker include the following:

- an ability to break through 6 feet of ice at 3 knots (threshold) or 8 feet of ice at three knots (objective);[40]
- an ability to break through ridged ice of 21 feet;
- an ability to operate without replenishment (i.e., resupply) for 80 days (threshold) or 90 days (objective); and
- an ability to exchange voice and data with DHS, Coast Guard, Defense Department units, and other stakeholders.[41]

Additional desired capabilities include the following:

- an ability to operate for a total of 3,300 hours (the equivalent of 137.5 days) per year (threshold) or a total of 4,050 hours (the equivalent of 168.75 days) per year (objective);
- an operational availability (i.e., percentage of time available for operation) of 85% (threshold) or 92% (objective); and
- a space and weight allowance for accommodating a communication workspace (objective) or an installed communication workspace (threshold).[42]

The Coast Guard states that the desired capabilities for a new polar icebreaker are similar to the capabilities of *Polar Star* and *Polar Sea* in the following general ways:

(...continued)

26, 2015. Material in brackets as in original.

[40] The terms *threshold* and *objective* are acquisition terms. Threshold can be translated roughly as minimum required capability. Objective can be translated roughly as maximum or preferred capability (if feasible and affordable).

[41] Coast Guard polar icebreaker program industry day briefing entitled "Polar Icebreaker (PIB) Acquisition Program Industry Engagement," slide 23, accessed April 4, 2016, at http://www.uscg.mil/ACQUISITION/icebreaker/pdf/Industry%20Day%2018%20March%202016.pdf.

[42] Coast Guard polar icebreaker program industry day briefing entitled "Polar Icebreaker (PIB) Acquisition Program Industry Engagement," slide 32, accessed April 4, 2016, at http://www.uscg.mil/ACQUISITION/icebreaker/pdf/Industry%20Day%2018%20March%202016.pdf.

- the ability to conduct long-range, high-endurance, independent operations with heavy icebreaking capability;
- flexibility in personnel support spaces and systems;
- interoperability to support interagency and interservice mission execution.[43]

The Coast Guard states that the desired capabilities for a new polar icebreaker differ from the capabilities of *Polar Star* and *Polar Sea* in the following general ways:

- features for improved reliability, maintainability, supportability, operational availability, and system redundancy;
- features for meeting modern environmental standards;
- features for improved ship control;
- features for modern human habitability and human systems integration; and
- space, weight, and power margins (i.e., growth margin) for accepting specialized capabilities.[44]

Notional Program Schedule

The Coast Guard's notional schedule for the program, which could change, shows a draft Request for Proposals (RFP) being released in the first quarter of FY2017, a final RFP being released in the fourth quarter of FY2017 or the first quarter of FY2018, Coast Guard evaluation of received proposals taking place from the third or fourth quarter of FY2018 through the third or fourth quarter of FY2019, a contract award being made in the third or fourth quarter of FY2019, and construction of the ship beginning in the third or fourth quarter of FY2019.[45]

Strategy of Using Funding Contributions from Other Agencies

The Coast Guard's strategy for funding the acquisition of a new polar icebreaker appears to depend on having other federal agencies help pay for part of the ship's cost. The Coast Guard's website for the polar icebreaker acquisition project states:

> A new, heavy polar icebreaker will be designed to meet the requirements of multiple government stakeholders that require access to and presence within the polar regions. In order to appropriately fund the acquisition of a new polar icebreaker, a "whole-of-government" funding approach is necessary to acquire this national asset.[46]

[43] Coast Guard polar icebreaker program industry day briefing entitled "Polar Icebreaker (PIB) Acquisition Program Industry Engagement," slide 24, accessed April 4, 2016, at http://www.uscg.mil/ACQUISITION/icebreaker/pdf/Industry%20Day%2018%20March%202016.pdf.

[44] Coast Guard polar icebreaker program industry day briefing entitled "Polar Icebreaker (PIB) Acquisition Program Industry Engagement," slide 26, accessed April 4, 2016, at http://www.uscg.mil/ACQUISITION/icebreaker/pdf/Industry%20Day%2018%20March%202016.pdf.

[45] Coast Guard polar icebreaker program industry day briefing entitled "Polar Icebreaker (PIB) Acquisition Program Industry Engagement," slide 14, accessed April 4, 2016, at http://www.uscg.mil/ACQUISITION/icebreaker/pdf/Industry%20Day%2018%20March%202016.pdf.

[46] U.S. Coast Guard, "Polar Icebreaker," accessed April 4, 2016, at http://www.uscg.mil/acquisition/icebreaker/default.asp.

Funding Requested in FY2013-FY2017 Submissions

FY2013 Submission

The Administration's FY2013 budget submission initiated a new project for the design and construction of a new polar icebreaker, and included $860 million over five years for the acquisition of the ship (**Table 3**)—enough or almost enough to fully fund the acquisition of a new polar icebreaker. (Any remaining needed funding might have been projected for FY2018 and perhaps also FY2019, which were beyond the five-year window of the FY2013 budget submission.) The submission stated that DHS anticipated awarding a construction contract for the ship "within the next five years" (i.e., by FY2018) and taking delivery on the ship "within a decade" (i.e., by 2023).[47]

FY2014 Submission

The Administration's FY2014 budget submission reduced the five-year funding for a new polar icebreaker to $230 million (**Table 3**)—a 73% reduction from the figure in the FY2013 budget submission—but still stated that DHS anticipated awarding a construction contract for the ship "within the next four years" (i.e., by FY2018).[48]

FY2015 Submission

The Administration's FY2015 budget submission maintained five-year funding for a new polar icebreaker at $230 million (**Table 3**), but did not state when a construction contract for the ship might be awarded, creating uncertainty about the timing of the project.[49]

FY2016 Submission

The Administration's FY2016 budget submission, submitted to Congress in February 2015, reduced five-year funding for a new polar icebreaker further, to $166 million (**Table 3**)—an 81% reduction from the figure in the FY2013 budget submission—and again did not state when a construction contract for the ship might be awarded, maintaining the uncertainty about the timing of the project.[50]

On September 1, 2015, the White House issued a fact sheet in conjunction with a visit to Alaska by President Obama indicating that the Administration, in its own internal planning, had at some point over the past two years deferred acquisition of a new polar icebreaker to FY2022, but that this has now been changed to FY2020.[51] The newly announced construction start date of FY2020

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[47] U.S. Department of Homeland Security, *Annual Performance Report, Fiscal Years 2011-2013*, p. CG-AC&I-40 (pdf page 1,777 of 3,134).

[48] Department of Homeland Security, United States Coast Guard, *Fiscal Year 2014 Congressional Justification*, p. CG-AC&I-32 (pdf page 204 of 403).

[49] Department of Homeland Security, United States Coast Guard, *Fiscal Year 2015, Congressional Justification*, p. CG-AC&I-42 (pdf page 196 of 474).

[50] Department of Homeland Security, United States Coast Guard, *Fiscal Year 2016 Congressional Justification*, p. CG-AC&I-36 (pdf page 202 of 518).

[51] The White House, "Fact Sheet: President Obama Announces New Investments to Enhance Safety and Security in the Changing Arctic," September 1, 2015, accessed September 2, 2015, at https://www.whitehouse.gov/the-press-office/2015/09/01/fact-sheet-president-obama-announces-new-investments-enhance-safety-and. Regarding icebreakers, the fact sheet states:

(continued...)

is a two-year acceleration from what was previously unpublicized date of FY2022, and a two-year deferral from the FY2018 date implied in the FY2013 and FY2014 budget submissions. The fact sheet states that the Administration will also "begin planning for construction of additional icebreakers" beyond the one that the Administration proposes to begin building in FY2020.

On January 13, 2016, the Coast Guard announced that it intended to hold an industry day for the polar icebreaker program, followed by one-on-one meetings between the Coast Guard and prospective shipbuilders and ship designers, as a part of the Coast Guard's ongoing market research for the program.[52] The industry day was held on March 18, 2016, and the one-on-one meetings between the Coast Guard and industry officials were scheduled for March 28-31, with industry feedback to be submitted to the Coast Guard by April 5, 2016.[53]

FY2017 Submission

The Coast Guard's proposed FY2017 budget requests $150 million in acquisition funding for a new polar icebreaker that the Coast Guard wants to begin building in FY2020. The figure of $150 million includes $147.6 million in the polar icebreaker line of the Coast Guard's Acquisition, Construction, and Improvements (AC&I) account, and $2.4 million that is embedded in the personnel and management line in the AC&I account.[54] As shown in **Table 3**, the $150 million requested for FY2017 is the first major increment of acquisition funding requested (not just projected for a future fiscal year) for a new polar icebreaker. The Coast Guard states that the requested $150 million

> Funds completion of programmatic planning documents and award of a contract for Detail Design and all other design activities leading to commencement of production activities for a heavy polar-class icebreaker by 2020. To maintain an accelerated acquisition schedule, the 2017 request forward funds acquisition activities to occur

(...continued)

> **Accelerating the acquisition of new Coast Guard icebreakers.** After World War II, the United States Coast Guard had seven icebreakers in its fleet—four under the U.S. Navy and three under the U.S. Coast Guard. Today, the United States technically has three icebreakers in its fleet—all under the command of the U.S. Coast Guard. However, when age and reliability are taken into account, the fleet is down to the equivalent of two fully functional icebreakers and only one heavy-duty icebreaker. Russia, on the other hand, has forty icebreakers and another eleven planned or under construction.
>
> The growth of human activity in the Arctic region will require highly engaged stewardship to maintain the open seas necessary for global commerce and scientific research, allow for search and rescue activities, and provide for regional peace and stability. Accordingly, meeting these challenges requires the United States to develop and maintain capacity for year-round access to greater expanses within polar regions.
>
> That is why the Administration will propose to accelerate acquisition of a replacement heavy icebreaker to 2020 from 2022, begin planning for construction of additional icebreakers, and call on Congress to work with the Administration to provide sufficient resources to fund these critical investments. These heavy icebreakers will ensure that the United States can meet our national interests, protect and manage our natural resources, and strengthen our international, state, local, and tribal relationships.

[52] "USCG Polar Class Icebreaker Replacement Program," accessed January 15, 2016, at https://www.fbo.gov/index?s=opportunity&mode=form&id=a778c49349c443d2658666e19cc100e9&tab=core&tabmode=list&=.

[53] "Heavy Polar Icebreaker Industry Engagement Activities," accessed April 4, 2016, at http://www.uscg.mil/ACQUISITION/icebreaker/Industry_Day_031816.asp.

[54] Department of Homeland Security, United States Coast Guard, *Fiscal Year 2017 Congressional Justification*, pp. CG-AC&I-28 and CG-AC&I-47 (pdf pages 170 and 189 of 407).

> through 2019. The availability of these funds will give Coast Guard maximum flexibility to implement an optimal acquisition approach....
>
> Activities in FY 2017 will focus on completion of programmatic planning documents and issue of the Request for Proposal (RFP) for Detail Design.[55]

Table 3. Funding for Acquisition of New Polar Icebreaker Under FY2013-FY2017 Budget Submissions

(millions of then-year dollars)

	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	5-year total
FY2013 budget	8	120	380	270	82				860
FY2014 budget		2	8	100	20	100			230
FY2015 budget			6	4	100	20	100		230
FY2016 budget				4	10	2	100	50	166
FY2017 budget					150	n/a	n/a	n/a	n/a

Source: Table prepared by CRS based on Coast Guard FY2013-FY2017 budget submissions.

Notes: n/a means not available. For each line in the table, the first figure shown (e.g., $8 million in the case of the FY2013 budget) is the amount of funding that was requested for that fiscal year. Actual funding figures for FY2013-FY2016 are as follows: $7.609 million in FY2013; $2.0 million in FY2014; zero in FY2015; and $6.0 million in FY2016, for a total of $15.609 million for the period FY2013-FY2016.

Actual Prior-Year Funding in FY2013-FY2016

In each line of **Table 3**, the first figure shown (e.g., $8 million in the case of the FY2013 budget) is the amount of funding that was requested for that fiscal year. Actual funding figures for FY2013-FY2016 are as follows: $7.609 million in FY2013; $2.0 million in FY2014; zero in FY2015; and $6.0 million in FY2016, for a total of $15.609 million for the period FY2013-FY2016.

Further Extending *Polar Star* or Reactivating *Polar Sea*

A polar icebreaker that begins construction in FY2020, as the Administration is proposing, might enter service in 2024 or 2025. *Polar Star* has been refurbished and reentered service in December 2012 for an intended period of 7 to 10 years—a period that will end between December 2019 and December 2022. The Coast Guard is examining the feasibility and potential cost effectiveness of either further extending the service life of *Polar Star* or repairing *Polar Sea* and bringing it back into service, so as to bridge the time between the end of *Polar Star's* intended current 7- to 10-year operating period and the entry into service of a new polar icebreaker.

Whether it would be feasible and cost effective to extend the service life of *Polar Star* beyond the end of its current 7- to 10-year period of service is not clear. As discussed earlier, the Coast Guard estimates that repairing *Polar Sea* to support its reactivation for 7 to 10 additional years of operation likely would cost more than $100 million (not including the ship's annual operation and support costs for those 7 to 10 years). The Coast Guard states that

[55] Department of Homeland Security, U.S. Coast Guard, *Fiscal Year 2017 Congressional Justification*, p. CG-AC&I-47 (pdf page 189 of 407).

> One of Coast Guard's two polar-class icebreakers (POLAR STAR) is operational following a reactivation in 2013 that provided an estimated 7-10 years of useful life. The second (POLAR SEA) is out of service and undergoing a Material Condition Assessment and an Alternatives Analysis to evaluate the feasibility of reactivation. To ensure the Nation is able to maintain heavy icebreaking capability until replacement assets are delivered, the Coast Guard is evaluating extending the service life of one of these icebreakers. Results from the Materiel Condition Assessment and Alternatives Analysis, planned for 2016, will inform selection of the candidate icebreaker. Funds requested [for FY2017] ($3 million) [in the Survey and Design—Vessel and Boats line of the Coast Guard's AC&I account] will support the specification development for the reactivation/sustainment of the selected icebreaker.[56]

Acquisition Actions Prior to January 2016

This section briefly reviews Coast Guard polar icebreaker acquisition actions prior to the Coast Guard's announcement of January 13, 2016.

A December 10, 2015, press report stated:

> The Coast Guard is ramping up its engagement with industry in the hopes of finalizing an acquisition strategy for a new heavy icebreaker by next spring, its top acquisition officer said Wednesday [December 9].
>
> The service plans on hosting an industry day early next year to seek input from companies on technologies and potential designs for the vessel, said Rear Adm. Mike Haycock, Coast Guard director of acquisition programs and program executive officer....
>
> The hope is to find a "whole of government solution" in which other agencies and military services will help pay for the vessel, Haycock said.
>
> "The proof will be whether that materializes," he said. To help generate interest, the Coast Guard created an integrated product team consisting of 11 governmental organizations, including the Marine Corps, Office of the Chief of Naval Operations and Naval Sea Systems Command, which have provided feedback on potential requirements.
>
> None of them have volunteered funding thus far, but the Coast Guard plans to ask for more money for its own budget in the president's fiscal year 2017 budget request to help accelerate acquisition activities, he told Defense Daily after the event....
>
> Department of Homeland Security approval of an operational requirements document could occur as early as January, Haycock said.
>
> To drive down costs and speed up the development process, the Coast Guard wants to "leverage the work that's already been done" both by industry and partner nations, he said. The service has interfaced with the Canadian government, for instance, but found that the U.S. requirements were significantly different because Canada has a shorter transit to the Arctic.
>
> It also wants to evaluate the technologies and hull designs that have emerged since the Polar Sea and Polar Star were designed in the 1960s. Since then, emission standards and other regulations have changed. A new icebreaker could incorporate features that make it more efficient, maneuverable and powerful, such as a double hull, advances in propulsion, fixed pitch propellers, integrated power plants and advanced hull forms.

[56] Department of Homeland Security, United States Coast Guard, *Fiscal Year 2017 Congressional Justification*, pp. CG-AC&I-29 and CG-AC&I-30 (pdf pages 171 and 172 of 407).

> None of the requirements have been set in stone, but broadly speaking, the Coast Guard wants a vessel that can break 6 foot deep sheets of ice at 3 knots, Haycock said.
>
> The icebreaker will also need to have some level of multi-mission capability, such as an oil skimming system and space, weight and power reservations.[57]

At a November 17, 2015, hearing before the Europe, Eurasia, and Emerging Threats subcommittee and the Western Hemisphere subcommittee of the House Foreign Affairs Committee, Vice Admiral Charles Michel, the Vice Commandant of the Coast Guard, testified that

> The DHS is working with the Administration to support the President's announced intention to accelerate the acquisition of a replacement heavy polar icebreaker and begin planning for construction of additional icebreakers.... The USCGC POLAR STAR operates with aging equipment and the recent reactivation effort is expected to extend its lifespan for only another five to eight years. The Coast Guard is finalizing operational requirements documentation as part of the acquisition process to acquire new heavy polar icebreakers to address future needs.[58]

A March 6, 2015, press report stated:

> The Coast Guard is in consultation with the Canadians and Finnish ship designers on technology that could end up in a future U.S. icebreaker, the service's assistant commandant for acquisitions said on Thursday [March 5].
>
> "We're working very closely with the Canadians and the Finns because there's a small technological base of real ice breaking experts in the world," Rear Adm. Bruce Baffer said....
>
> "We're trying to keep from recreating the wheel whenever we can."[59]

An October 6, 2014, trade press report stated:

> Reaching out to industry, the Coast Guard has issued a Request for Information (RFI) for commercial heavy polar icebreaker designs and the capability of industry in the United States to build such a ship....
>
> In a Sept. 30 notice in the FedBizOpps.gov, the Coast Guard says the RFI is a "precursor" to a potential procurement of a non-nuclear polar icebreaker. The Coast Guard is interested in commercial and scientific research icebreakers that can be, or be configured to meet, its operational mission requirements. Responses may be used to help the service develop an acquisition strategy, it says.
>
> The minimum mission set is to be able to perform operations that the 399-foot Polar Star can do, the Coast Guard says.[60]

The Coast Guard stated on June 20, 2014, that

> The U.S. Coast Guard's Polar Icebreaker acquisition project achieved the next acquisition milestone on June 13, 2014, with approval to enter the Analyze/Select phase of the

[57] Valerie Insinna, "Coast Guard to Finalize Acquisition Strategy for New Heavy Icebreaker Next Spring," Defense Daily, December 10, 2015: 1-3.

[58] Testimony of Vice Admiral Charles D. Michel, Vice Commandant, U.S. Coast Guard, on "Arctic Operations" Before the House Foreign Affairs Committee—Western Hemisphere & Europe, Eurasia, and Emerging Threats Subcommittees, November 17, 2015, p. 3.

[59] Sam LaGrone, "Coast Guard Working With Canadians, Finns on Future Icebreaker Design," USNI News, March 6, 2015.

[60] Calvin Biesecker, "Coast Guard Requests Information On Heavy Polar Icebreaker," *Defense Daily*, October 6, 2014.

> Department of Homeland Security acquisition lifecycle. This action validates the need for continued icebreaker capabilities and allows the project to move forward to the next acquisition phase.
>
> Approval to proceed was granted after the Coast Guard identified specific capabilities necessary to address mission performance gaps and prepared a formal mission need statement, concept of operations overview and preliminary acquisition plan. During the Analyze/Select Phase, the Coast Guard will develop operational requirements for a future polar icebreaker, identify resources required to maintain the asset through its lifecycle and assess potential alternatives capable of meeting polar icebreaking mission requirements.[61]

Reduction AC&I Account Starting with FY2014 Budget Submission

The reduction in five-year funding for a new polar icebreaker during the FY2014-FY2016 budget submissions (see **Table 3**) appears to have been related to a substantial reduction in the annual funding levels in the Coast Guard's Acquisition, Construction, and Improvements (AC&I) account that began with the Coast Guard's FY2014 budget submission (see **Table 4**). Prior to the release of the Administration's September 1, 2015, fact sheet, the Coast Guard testified that if annual funding levels in the AC&I account were not increased from currently programmed levels, the icebreaker would be, essentially, an unfunded requirement. For example, at an April 28, 2015, hearing on Coast Guard resources and priorities before the Oceans, Atmosphere, Fisheries, and Coast Guard subcommittee of the Senate Commerce, Science, and Transportation Committee, Admiral Paul Zukunft, the Commandant of the Coast Guard, testified that

> by reactivating Polar Star, we have purchased up to 10 years of decision space to recapitalize our ice-breaking fleet. Two of those years have expired. And while I'm exploring several options to reconstitute our nation's fleet of icebreakers, I will need topline relief [i.e., an increase] in my acquisition budget to make this requirement a reality.[62]

Table 4. Funding in AC&I Account in FY2013-FY2017 Budgets

(millions of dollars, rounded to nearest tenth)

	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	Avg.	% change compared to avg. for FY13 budget
FY13 budget	1,217.3	1,429.5	1,619.9	1,643.8	1,722.0					1,526.5	—
FY14 budget		951.1	1,195.7	901.0	1,024.8	1,030.3				1,020.6	-33.1%
FY15 budget			1,084.2	1,103.0	1,128.9	1,180.4	1,228.7			1,145.0	-25.0%
FY16 budget				1,017.3	1,125.3	1,255.7	1,201.0	1,294.6		1,178.8	-22.8%
FY17 budget					1,136.8	n/a	n/a	n/a	n/a	n/a	n/a

Source: Table prepared by CRS based on Coast Guard FY2013-FY2017 budget submissions.

Note: n/a means not available.

[61] "Acquisition Update: Polar Icebreaker Acquisition Project Approved For Next Phase," June 20, 2014, accessed December 23, 2014, at http://www.uscg.mil/acquisition/newsroom/updates/icebreaker062014.asp.

[62] Source: Transcript of hearing.

Issues for Congress

In considering whether to approve, reject, or modify the Administration's FY2017 acquisition funding request for a new polar icebreaker and, more generally, whether to approve, reject, or modify the Coast Guard's overall plan for sustaining and modernizing the polar icebreaking fleet, Congress may consider various issues, including those discussed in the sections below.

Cost of Planning and Design Work; Timing of Funding

One potential issue for Congress is whether the Coast Guard has properly priced the polar icebreaker planning and design work to be funded in FY2017, as well as the potential advantages or disadvantages of providing all this requested planning and design funding in FY2017, or deferring some of it to later fiscal years.

Potential for Accelerating Start of Construction

Another potential issue for Congress is whether it would be feasible to accelerate the start of construction of a new polar icebreaker from FY2020 to an earlier year—so as to reduce the need for further extending the service life of *Polar Star* or repairing and bringing back into service *Polar Sea*—and, if so, what the potential benefits, costs, and risks of doing this might be.

Strategy of Using Funding Contributions from Other Agencies

Another potential issue for Congress concerns the Coast Guard's strategy of funding the acquisition of a polar icebreaker using contributions from other agencies. There is some precedent for the idea of funding the acquisition of a new polar icebreaker in part with contributions from other federal agencies: the acquisition of *Healy* was funded largely with DOD funding that was provided primarily through the Navy's shipbuilding account, known formally as the Shipbuilding and Conversion, Navy (SCN) account.[63] Other federal agencies, however, currently face challenges in being able to fund their own programs within funding constraints, raising a question as to whether they would be able to contribute significant amounts of funding to a project to acquire a new polar icebreaker.

Acquiring Two Polar Icebreakers with a Block Buy Contract

Another potential issue for Congress concerns the contracting approach for polar icebreaker acquisition. Given the earlier-cited DHS Mission Need Statement (MNS) for polar icebreakers, as

[63] The somewhat complicated funding history for the ship is as follows: The Coast Guard's proposed FY1990 budget requested $244 million for the acquisition of an icebreaker. The FY1990 DOD appropriations act (H.R. 3072/P.L. 101-165 of November 21, 1989) provided $329 million for ship in the SCN account. (See pages 77 and 78 of H.Rept. 101-345 of November 13, 1989.) This figure was then reduced by $4.2 million by a sequester carried out under the Balanced Budget And Emergency Deficit Control Act of 1985, also known as the Gramm-Rudman-Hollings Act (H.J.Res. 372/P.L. 99-177 of December 12, 1985). Another $50 million was rescinded by the Dire Emergency Supplemental Appropriations for Disaster Assistance, Food Stamps, Unemployment Compensation Administration, and Other Urgent Needs, and Transfers, and Reducing Funds Budgeted for Military Spending Act of 1990 (H.R. 4404/P.L. 101-302 of May 25, 1990). An additional $59 million for the ship was then appropriated in the FY1992 DOD Appropriations Act (H.R. 2521/P.L. 102-172 of November 26, 1991). Also, an additional $40.4 million in acquisition funding for the ship was provided through a series of annual appropriations in the Coast Guard's AC&I account from FY1988 through FY2001. The resulting net funding for the ship was thus $374.2 million, of which $333.8 million, or 89.2%, was DOD funding, and $40.4 million, or 10.8%, was Coast Guard acquisition funding. (Source: Undated Coast Guard information paper provided to CRS by Coast Guard legislative liaison office, March 3, 2016.)

well as the Administration's statement in its September 1, 2015, fact sheet that it will "begin planning for construction of additional icebreakers" beyond the one that it proposes to begin building in FY2020, one possible option that Congress may wish to consider is acquiring two polar icebreakers under a single multiyear contract known as a block buy contract. Such a contract could allow for construction of the first icebreaker to begin in FY2020, as the Administration is proposing, and for construction of the second icebreaker to begin a few years after that.

As testified by CRS at both a February 3, 2016, hearing on Coast Guard cutter acquisition[64] and a December 1, 2015, hearing on Navy ship acquisition,[65] the Navy in recent years has made extensive use of multiyear contracting (in the form of both multiyear procurement [MYP] and block buy contracting) to reduce the procurement costs of its ships. At the February 3, 2016, hearing on Coast Guard cutter acquisition, CRS testified that acquiring two polar icebreakers with a single block buy contract might reduce the combined acquisition cost of the two ships by upwards of $100 million.[66]

As CRS has also testified, from a congressional perspective, trade-offs in using block buy contracting include the following: reduced congressional control over year-to-year spending, and tying the hands of future Congresses; reduced flexibility for making changes in Coast Guard acquisition programs in response to unforeseen changes in strategic or budgetary circumstances (which can cause any needed funding reductions to fall more heavily on acquisition programs not covered by multiyear contracts); a potential need to shift funding from later fiscal years to earlier fiscal years to fund economic order quantity (EOQ) purchases (i.e., up-front batch purchases) of components; the risk of having to make penalty payments to shipbuilders if multiyear contracts need to be terminated due to unavailability of funds needed to the continue the contracts; and the risk that materials and components purchased for ships to be acquired in future years might go to waste if those ships are not eventually acquired.[67]

Building Polar Icebreakers in Foreign Shipyards

Another potential issue for Congress concerns the possibility of building polar icebreakers for the U.S. Coast guard in foreign shipyards. Some observers believe the acquisition cost of U.S. Coast Guard polar icebreakers could be reduced, perhaps substantially, by building them in a foreign shipyard, such as a yard in one of the Nordic countries that is experienced in building icebreakers. Shipyards in Finland reportedly are interested in building polar icebreakers for the U.S. Coast Guard.[68]

Some observers have suggested that a U.S. law known as the Jones Act prevents the U.S. Coast Guard from buying or operating a foreign-built polar icebreaker. The Jones Act, however, does not prevent the U.S. Coast Guard from buying or operating a foreign-built polar icebreaker.[69] Two

[64] CRS Testimony TE10004, *The Status of Coast Guard Cutter Acquisition Programs*, by (name redacted) , p.5.

[65] CRS Testimony TE10001, *Acquisition Efficiency and the Future Navy Force*, by (name redacted) , p.4.

[66] CRS Testimony TE10004, *The Status of Coast Guard Cutter Acquisition Programs*, by (name redacted) , p.6.

[67] See, for example, CRS Testimony TE10004, *The Status of Coast Guard Cutter Acquisition Programs*, by (name r edacted) , pp.1-2.

[68] See, for example, Jim Paulin, "Finland Wants In On US Icebreaker Investment," *Alaska Dispatch News*, September 8, 2015.

[69] The Jones Act (Section 27 of the Merchant Marine Act of 1920, P.L. 66-261) applies to vessels transporting "merchandise" from one U.S. point to another U.S. point. It requires that such transportation be performed in U.S.-built vessels owned by U.S. citizens and registered in the United States; U.S. registration, in turn, requires that crew (continued...)

other laws, however, are of note in connection with the idea of building a U.S. Coast Guard polar icebreaker in a foreign shipyard. One is 14 U.S.C. 665, which states:

> §665. Restriction on construction of vessels in foreign shipyards
>
> (a) Except as provided in subsection (b), no Coast Guard vessel, and no major component of the hull or superstructure of a Coast Guard vessel, may be constructed in a foreign shipyard.
>
> (b) The President may authorize exceptions to the prohibition in subsection (a) when the President determines that it is in the national security interest of the United States to do so. The President shall transmit notice to Congress of any such determination, and no contract may be made pursuant to the exception authorized until the end of the 30-day period beginning on the date the notice of such determination is received by Congress.

The other is 10 U.S.C. 7309, which states:

> §7309. Construction of vessels in foreign shipyards: prohibition
>
> (a) Prohibition.-Except as provided in subsection (b), no vessel to be constructed for any of the armed forces,[70] and no major component of the hull or superstructure of any such vessel, may be constructed in a foreign shipyard.
>
> (b) Presidential Waiver for National Security Interest.-(1) The President may authorize exceptions to the prohibition in subsection (a) when the President determines that it is in the national security interest of the United States to do so.
>
> (2) The President shall transmit notice to Congress of any such determination, and no contract may be made pursuant to the exception authorized until the end of the 30-day period beginning on the date on which the notice of the determination is received by Congress.
>
> (c) Exception for Inflatable Boats.-An inflatable boat or a rigid inflatable boat, as defined by the Secretary of the Navy, is not a vessel for the purpose of the restriction in subsection (a).

Funding Level of Coast Guard's AC&I Account

Another potential issue for Congress concerns the funding level of the Coast Guard's Acquisition, Construction, and Improvements (AC&I) account. The Coast Guard's apparent difficulty in

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(...continued)

members be U.S. citizens. Merchandise is defined to include "merchandise owned by the U.S. Government, a State, or a subdivision of a State; and valueless material" (46 U.S.C. §55102). Merchandise is further defined at 19 U.S.C. §1401(c) to mean "goods, wares, and chattels of every description." It is the waterborne transportation of merchandise domestically that triggers the Jones Act. A vessel wishing to engage in such transportation would apply to the U.S. Coast Guard for a "coastwise endorsement." Thus, an icebreaker strictly performing the task it is designed for and not transporting cargo from one U.S. point to another would not be subject to the Jones Act.

The federal agency in charge of deciding what kind of maritime activity must comply with the Jones Act, U.S. Customs and Border Protection (CBP), has confirmed that icebreaking is not one of those activities. In a 2006 ruling, which appears to be its most recent ruling on the subject, CPB informed Alcoa, Inc. that it could use foreign-built and foreign-flagged vessels for icebreaking on the Hudson River in New York State. CBP reasoned that the transporting of equipment, supplies, and materials used on or from the vessel in effecting its service is not coastwise trade, provided that these articles are necessary for the accomplishment of the vessel's mission and are usually carried aboard the vessel as a matter of course. The 2006 ruling cited earlier rulings in 1974, 1985, and 2000 as precedent.

For more on the Jones Act, see CRS Report RS21566, *The Jones Act: An Overview*, by (name redacted)

[70] 14 U.S.C. 1, which establishes the Coast Guard, states: "The Coast Guard, established January 28, 1915, shall be a military service and a branch of the armed forces of the United States at all times."

identifying funding from within its own budget to fully fund the acquisition of a new polar icebreaker can be viewed as an issue that is not specific to the polar icebreaker program but rather one example of a larger challenge the Coast Guard faces in funding various acquisition projects within an AC&I account that has been reduced in the Coast Guard's FY2014-FY2016 budget submissions to roughly $1 billion to $1.2 billion per year.

The Coast Guard has testified that acquiring the ships and aircraft in its program of record (POR) on a timely basis while also adequately funding other Coast Guard acquisition programs would require a funding level for the AC&I account of roughly $1.5 billion to $2.5 billion per year. As shown earlier in **Table 4**, the Administration's FY2013 budget submission programmed an average of about $1.5 billion per year in the AC&I account. As also shown in the table, subsequent budget submissions have reduced that figure to roughly $1 billion to $1.2 billion per year.

At a June 26, 2013, hearing on Coast Guard acquisition before the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee, CRS testified that

> The Coast Guard's FY2014 Five Year (FY2014-FY2018) CIP includes a total of about $5.1 billion in acquisition funding, which is about $2.5 billion, or about 33%, less than the total of about $7.6 billion that was included in the Coast Guard's FY2013 Five Year (FY2013-FY2017) CIP. (In the four common years of the two plans—FY2014-FY2017—the reduction in funding from the FY2013 CIP to the FY2014 CIP is about $2.3 billion, or about 37%.) This is one of the largest percentage reductions in funding that I have seen a five-year acquisition account experience from one year to the next in many years.
>
> About twenty years ago, in the early 1990s, Department of Defense (DOD) five-year procurement plans were reduced sharply in response to the end of the Cold War—a large-scale change in the strategic environment that led to a significant reduction in estimated future missions for U.S. military forces. In contrast to that situation, there has been no change in the Coast Guard's strategic environment since last year that would suggest a significant reduction in estimated future missions for the Coast Guard.[71]

For additional discussion of the issue of the funding level of the AC&I account, see **Appendix B**.

Acquisition vs. Leasing

Another potential issue for Congress is whether future polar icebreakers should be acquired through a traditional acquisition (i.e., the government procuring the ship and owning it throughout its service life) or through a leasing arrangement (under which the icebreakers would be privately built and privately owned, leased to the Coast Guard, and crewed by an all-Coast Guard crew or a mix of Coast Guard personnel and civilian mariners). Factors to consider in assessing this issue include the comparative costs of the two options and the potential differences between them in terms of factors such as average number of days of operation each year and capability for performing various missions. Comparing the potential costs of leasing versus purchasing a capital asset often involves, among other things, calculating the net present value of each option.

[71] Statement of Ronald O'Rourke, Specialist in Naval Affairs, Congressional Research Service, before the House Transportation and Infrastructure Committee, Subcommittee on Coast Guard and Maritime Transportation, Hearing on Coast Guard Readiness: Examining Cutter, Aircraft, and Communications Needs, June 26, 2013, p. 1.

At a December 1, 2011, hearing before the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee that focused on the polar icebreaker fleet, Admiral Robert Papp, the Commandant of the Coast Guard at the time, stated:

> As far as we can determine, there are no icebreakers available—no heavy icebreakers available for leasing right now. They would have to be constructed [and then leased].
>
> If we were to lease an icebreaker, I'm sure that a company building an icebreaker outside of the government does not have to contend with the same federal acquisition rules that we have to if we were to construct an icebreaker. It could probably be done quicker.
>
> Personally, I'm ambivalent in terms of how we get an icebreaker for the Coast Guard. We've done the legal research. If we lease an icebreaker, we can put a Coast Guard crew on it and still have it as a U.S. vessel supporting U.S. sovereignty.
>
> But the—but they aren't available right now. And the other challenge that we face is the federal acquisition rules and [Office of Management and Budget Circular] A-11 requirements that [direct how to] score the money [in the budget] for leasing. We'd have to put up a significant amount of upfront money even with a lease that we don't have room for within our budget currently.[72]

At another point in the hearing, Admiral Papp stated:

> We have looked at various business case scenarios, each and every time looking at, once again, from our normal perspective, the Coast Guard perspective, which has been owning ships forever. And generally, we keep ships 30-40 years or beyond. There is a point where leasing becomes more expensive, it's at or about the 20-25-year timeline.
>
> I just don't have the experience with leasing to be able to give you a good opinion on it. And once again, I'm ambivalent. We just need the icebreaking capability, I think it's for people who can do the analysis, the proper analysis of—but also have to take into account the capabilities required and we need to get about the business of determining the exact capabilities that we need which would take into account National Science Foundation requirements, Coast Guard requirements, requirements to break-in at McMurdo, to come up with a capable ship.[73]

At another point in the hearing, he stated:

> As I said, sir, I am truly ambivalent to this except from what I experienced. I do have now two points, yes the Navy leases some ships, but we've got a Navy that has well over 300 ships.
>
> So if they lose a leased vessel or something is pulled back or something happens, they have plenty of other ships they can fall back upon. Right now, all I am falling back on is the Coast Guard cutter Healy. And it feels good to know that we own that and that is our ship for 30 or 40 years and we can rely upon it.
>
> In terms of leasing, I don't know. My personal experience is I lease one of my two cars and I pay a lot of money leasing my car. But at the end of the lease period, I have no car and I've spent a lot of money. So I don't know if that's directly applicable to ships as well, but right now I got half my garage is empty because I just turned one in.[74]

[72] Source: Transcript of hearing.

[73] Source: Transcript of hearing.

[74] Source: Transcript of hearing.

At another point in the hearing, he stated:

> We've looked through the legal considerations on this, as long as we have a Coast Guard crew. In fact, you can even make a mixed crew of civilians and Coast Guard people. But as long as it's commanding by—commanded by [a] commissioned officer, you can assert sovereignty, you can take it into war zones and, in fact, the Navy does that as well.[75]

Another witness at the hearing—Mead Treadwell, the lieutenant governor of Alaska—stated:

> [Regarding] The issue of the ships, the company that is building these ships for Shell [Oil] has visited with me and other state officials, and that's why you heard us say in our testimony that we think the leasing option should be considered. We don't have a way to judge the relative cost. But if on the face of it, it seems like it may be a way to get us the capability that the admiral needs.[76]

Another witness at the hearing—Jeffrey Garrett, a retired Coast Guard admiral who spent much of his career on polar icebreakers—stated:

> The perspective I could offer was when I was a member of the Cameron [sic: Commandant's?] staff back in the last '80s here in Washington, we were directed to pursue exactly the same sort of lease versus buy analysis, and in fact, the Coast Guard had a two track procurement strategy to compare leasing a new Polar icebreaker or buying it.
>
> And after over a year of analysis, studies, discussion with other agencies looking around, what became clear was, number one, there was no off-the-shelf asset readily available. And secondly, that in the long run, if you—when you cost it all out and the value of the stream of payments, leasing would actually cost more.
>
> And when we did the recapitalization analysis recently, we also reviewed leasing again, and the I think the findings in that report indicate more expensive over the life of the vessel by about 12 percent.[77]

When asked why this was the finding, Garrett stated:

> A couple of technical things. First of all, whoever builds the ship—and again, this will have to be ship built for the Coast Guard since there's not something off-the-shelf out there that you could lease. Whoever builds it has to raise capital, and nobody can raise capital more inexpensively than the federal government.
>
> Secondly, whoever leases the ship is obviously going to make—want to make a profit on that lease. So just like as Admiral Papp referred to leasing your car, you know, there's going to be a profit involved. And so, if you take the net present value of all of those, of those payments, you got come out with the more expensive package for the same, if you're comparing the same vessel.
>
> The other, the other issue I think is more intangible and that's just the fact that we're really not talking about an auxiliary like the Naval, like the Navy leases a supply ship or something like that. We're talking about a frontline Coast Guard capital asset, if you will,

[75] Source: Transcript of hearing.

[76] Source: Transcript of hearing. The transcript reviewed by CRS attributes this quote to the GAO witness, Stephen Caldwell, but this appears to be a mistake, as the statement is made by a member of the first witness panel, which included the Commandant of the Coast Guard and the Lieutenant Governor. The GAO witness was a member of the second witness panel. The reference in the quote to "me and other state officials" indicates that the witness speaking was the Lieutenant Governor and not the Commandant.

[77] Source: Transcript of hearing.

> capital ship that's going to be doing frontline government missions projecting U.S. sovereignty.
>
> And you know, the Navy doesn't lease those kinds of ships for its frontline fleet and the Coast Guard doesn't lease those kinds of ships for its mission capabilities, and that's what we're really talking about in terms of the ship we need here.
>
> So while a lease may look attractive, I think there are several things that indicate it may not be the right way to go. And the—I think that's what we came down to. And again, this is all documented in the past and that late '80s analysis was re-summarizing the president's 1990 report to Congress which basically says leasing is more expensive and it's not the way to go for a new ship. That was the ship that actually became the Healy then.[78]

The prepared statement of Stephen Caldwell, the GAO witness at the hearing, states:

> The three reports discussed earlier in this [GAO] statement all identify funding as a central issue in addressing the existing and anticipated challenges related to icebreakers. In addition to the Coast Guard budget analysis included in the Recapitalization report, all three reports reviewed alternative financing options, including the potential for leasing icebreakers, or funding icebreakers through the National Science Foundation (NSF) or the Department of Defense (DOD). Although DOD has used leases and charters in the past when procurement funding levels were insufficient to address mission requirements and capabilities, both the Recapitalization report and the High Latitude Study determined that the lack of existing domestic commercial vessels capable of meeting the Coast Guard's mission requirements reduces the availability of leasing options for the Coast Guard. Additionally, an initial cost-benefit analysis of one type of available leasing option included in the Recapitalization report and the High Latitude Study suggests that it may ultimately be more costly to the Coast Guard over the 30-year icebreaker lifespan.[79]

Legislative Activity for FY2017

Summary of Appropriation Action on FY2017 Funding Request

The Coast Guard's proposed FY2017 budget requests $150 million in acquisition funding for a new polar icebreaker. The figure of $150 million includes $147.6 million in the polar icebreaker line of the Coast Guard's Acquisition, Construction, and Improvements (AC&I) account, and $2.4 million that is embedded in the personnel and management line in the AC&I account.

Table 5 summarizes Congressional appropriation action on the Coast Guard's request for $147.6 million in funding in the polar icebreaker line of the AC&I account.

[78] Source: Transcript of hearing.

[79] Government Accountability Office, *Coast Guard[:] Observations on Arctic Requirements, Icebreakers, and Coordination with Stakeholders, Testimony Before the Subcommittee on Coast Guard and Maritime Transportation, Committee on Transportation and Infrastructure, House of Representatives, Statement of Stephen L. Caldwell, Director, Homeland Security and Justice*, GAO-12-254T, December 1, 2011, p. 24.

Table 5. Summary of Congressional Appropriations Action on FY2017 Funding Request

(millions of dollars)

	Request	HAC	SAC	Conf.
Polar icebreaker	$147.6			

Source: Table prepared by CRS, based on Coast Guard's FY2017 budget submission, and committee and conference reports. **HAC** is House Appropriations Committee; **SAC** is Senate Appropriations Committee; **Conf.** is conference agreement.

Notes: In addition to the request for $147.6 million shown in the table, the Coast Guard is requesting another $2.4 million for acquisition personnel costs related to the polar icebreaker program. This request for $2.4 million is embedded in the personnel and management line in the Coast Guard's AC&I account.

Icebreaker Recapitalization Act (S. 1386)

The text of S. 1386, introduced on May 19, 2015, states:

A BILL

To provide multiyear procurement authority for the procurement of up to six polar icebreakers to be owned and operated by the Coast Guard.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. Short title.

This Act may be cited as the "Icebreaker Recapitalization Act".

SEC. 2. Multiyear procurement authority for polar icebreakers.

(a) Multiyear procurement.—Subject to section 2306b of title 10, United States Code, the Secretary of the Navy shall enter into multiyear contracts for the procurement of up to six heavy duty polar icebreakers and any systems and equipment associated with those vessels.

(b) Authority for advance procurement.—The Secretary may enter into one or more contracts, beginning in fiscal year 2016, for advance procurement associated with the vessels, systems, and equipment for which authorization to enter into a multiyear contract is provided under subsection (a).

(c) Condition for Out-Year Contract Payments.—A contract entered into under subsection (a) shall provide that any obligation of the United States to make a payment under the contract for a fiscal year after fiscal year 2016 is subject to the availability of appropriations or funds for that purpose for such later fiscal year.

(d) Memorandum of agreement.—Not later than 180 days after the date of the enactment of this Act, the Secretary of the Navy and the Secretary of the Department in which the Coast Guard is operating shall enter into a memorandum of agreement establishing a process by which the Coast Guard, in concurrence with the Navy, shall—

(1) identify the vessel specifications, capabilities, systems, equipment, and other details required for the design of heavy polar icebreakers capable of fulfilling Navy and Coast Guard mission requirements, with the Coast Guard, as the sole operator of United States Government polar icebreaking assets, retaining final decision authority in the establishment of vessel requirements;

(2) oversee the construction of heavy polar icebreakers authorized to be procured under this section; and

(3) to the extent not adequately addressed in the 1965 Revised Memorandum of Agreement between the Department of the Navy and the Department of the Treasury on the Operation of Icebreakers, transfer heavy polar icebreakers procured through contracts authorized under this section from the Navy to the Coast Guard to be maintained and operated by the Coast Guard.

Appendix A. Recent Studies Relating to Coast Guard Polar Icebreakers

A number of studies have been conducted in recent years to assess U.S. requirements for polar icebreakers and options for sustaining and modernizing the Coast Guard's polar icebreaker fleet. This appendix presents the findings of some of these studies.

Coast Guard High Latitude Study Provided to Congress in July 2011

In July 2011, the Coast Guard provided to Congress a study on the Coast Guard's missions and capabilities for operations in high-latitude (i.e., polar) areas. The study, commonly known as the High Latitude Study, is dated July 2010 on its cover. The High Latitude Study concluded the following:

> [The study] concludes that future capability and capacity gaps will significantly impact four [Coast Guard] mission areas in the Arctic: Defense Readiness, Ice Operations, Marine Environmental Protection, and Ports, Waterways, and Coastal Security. These mission areas address the protection of important national interests in a geographic area where other nations are actively pursuing their own national goals....
>
> The common and dominant contributor to these significant mission impacts is the gap in polar icebreaking capability. The increasing obsolescence of the Coast Guard's icebreaker fleet will further exacerbate mission performance gaps in the coming years....
>
> The gap in polar icebreaking capacity has resulted in a lack of at-sea time for crews and senior personnel and a corresponding gap in training and leadership. In addition to providing multi-mission capability and intrinsic mobility, a helicopter-capable surface unit would eliminate the need for acquiring an expensive shore-based infrastructure that may only be needed on a seasonal or occasional basis. The most capable surface unit would be a polar icebreaker. Polar icebreakers can transit safely in a variety of ice conditions and have the endurance to operate far from logistics bases. The Coast Guard's polar icebreakers have conducted a wide range of planned and unscheduled Coast Guard missions in the past. Polar icebreakers possess the ability to carry large numbers of passengers, cargo, boats, and helicopters. Polar icebreakers also have substantial command, control, and communications capabilities. The flexibility and mobility of polar icebreakers would assist the Coast Guard in closing future mission performance gaps effectively....
>
> Existing capability and capacity gaps are expected to significantly impact future Coast Guard performance in two Antarctic mission areas: Defense Readiness and Ice Operations. Future gaps may involve an inability to carry out probable and easily projected mission requirements, such as the McMurdo resupply, or readiness to respond to less-predictable events. By their nature, contingencies requiring the use of military capabilities often occur quickly. As is the case in the Arctic, the deterioration of the Coast Guard's icebreaker fleet is the primary driver for this significant mission impact. This will further widen mission performance gaps in the coming years. The recently issued Naval Operations Concept 2010 requires a surface presence in both the Arctic and Antarctic. This further exacerbates the capability gap left by the deterioration of the icebreaker fleet....
>
> The significant deterioration of the Coast Guard icebreaker fleet and the emerging mission demands to meet future functional requirements in the high latitude regions dictate that the Coast Guard acquire material solutions to close the capability gaps....

To meet the Coast Guard mission functional requirement, the Coast Guard icebreaking fleet must be capable of supporting the following missions:

- **Arctic North Patrol.** Continuous multimission icebreaker presence in the Arctic.
- **Arctic West Science.** Spring and summer science support in the Arctic.
- **Antarctic, McMurdo Station resupply.** Planned deployment for break-in, supply ship escort, and science support. This mission, conducted in the Antarctic summer, also requires standby icebreaker support for backup in the event the primary vessel cannot complete the mission.
- **Thule Air Base Resupply and Polar Region Freedom of Navigation Transits.** Provide vessel escort operations in support of the Military Sealift Command's Operation Pacer Goose; then complete any Freedom of Navigation exercises in the region.

In addition, the joint Naval Operations Concept establishes the following mission requirements:

- **Assured access and assertion of U.S. policy in the Polar Regions.** The current demand for this mission requires continuous icebreaker presence in both Polar Regions.

Considering these missions, the analysis yields the following findings:

- **The Coast Guard requires three heavy and three medium icebreakers to fulfill its statutory missions.** These icebreakers are necessary to (1) satisfy Arctic winter and transition season demands and (2) provide sufficient capacity to also execute summer missions. Single-crewed icebreakers have sufficient capacity for all current and expected statutory missions. Multiple crewing provides no advantage because the number of icebreakers required is driven by winter and shoulder season requirements. Future use of multiple or augmented crews could provide additional capacity needed to absorb mission growth.
- **The Coast Guard requires six heavy and four medium icebreakers to fulfill its statutory missions and maintain the continuous presence requirements of the Naval Operations Concept.** Consistent with current practice, these icebreakers are single-crewed and homeported in Seattle Washington.
- **Applying crewing and home porting alternatives reduces the overall requirement to four heavy and two medium icebreakers.** This assessment of non-material solutions shows that the reduced number of icebreakers can be achieved by having all vessels operate with multiple crews and two of the heavy icebreakers homeporting in the Southern Hemisphere.

Leasing was also considered as a nonmaterial solution. While there is no dispute that the Coast Guard's polar icebreaker fleet is in need of recapitalization, the decision to acquire this capability through purchase of new vessels, reconstruction of existing ships, or commercial lease of suitable vessels must be resolved to provide the best value to the taxpayer. The multi-mission nature of the Coast Guard may provide opportunities to conduct some subset of its missions with non government-owned vessels. However, serious consideration must be given to the fact that the inherently governmental missions of the Coast Guard must be performed using government-owned and operated vessels. An interpretation of the national policy is needed to determine the resource level that best supports the nation's interests....

The existing icebreaker capacity, two inoperative heavy icebreakers and an operational medium icebreaker, does not represent a viable capability to the federal government. The

> time needed to augment this capability is on the order of 10 years. At that point, around 2020, the heavy icebreaking capability bridging strategy expires.[80]

At a July 27, 2011, hearing on U.S. economic interests in the Arctic before the Oceans, Atmosphere, Fisheries, and Coast Guard subcommittee of the Senate Commerce, Science, and Transportation Committee, the following exchange occurred:

> SENATOR OLYMPIA J. SNOWE: On the high latitude study, do you agree with—and those—I would like to also hear from you, Admiral Titley, as well, on these requirements in terms of Coast Guard vessels as I understand it, they want to have—I guess, it was a three medium ice breakers. Am in correct in saying that? Three medium ice breakers.
>
> ADMIRAL ROBERT PAPP, COMMANDANT OF THE COAST GUARD: I agree with the mission analysis and as you look at the requirements for the things that we might do up there, if it is in the nation's interest, it identifies a minimum requirement for three heavy ice breakers and three medium ice breakers and then if you want a persistent presence up there, it would require—and also doing things such as breaking out (inaudible) and other responsibilities, then it would take up to a maximum six heavy and four medium.
>
> SNOWE: Right. Do you agree with that?
>
> PAPP: If we were to be charged with carrying out those full responsibilities, yes, ma'am. Those are the numbers that you would need to do it.
>
> SNOWE: Admiral Titley, how would you respond to the high latitude study and has the Navy conducted its own assessment of its capability?
>
> REAR ADMIRAL DAVID TITLEY, OCEANORGRAPHER AND NAVIGATOR OF THE NAVY: Ma'am, we are in the process right now of conducting what we call a capabilities based assessment that will be out in the summer of this year.
>
> We are getting ready to finish that—the Coast Guard has been a key component of the Navy's task force on climate change, literally since day one when the Chief of Naval Operations set this up, that morning, we had the Coast Guard invited as a member of our executive steering committee.
>
> So we have been working very closely with the Coast Guard, with the Department of Homeland Security, and I think Admiral Papp—said it best as far as the specific comments on the high latitude study but we have been working very closely with the Coast Guard.[81]

January 2011 DHS Office of Inspector General Report

A January 2011 report on the Coast Guard's polar icebreakers from the DHS Office of the Inspector General stated:

> The Coast Guard does not have the necessary budgetary control over its [polar] icebreakers, nor does it have a sufficient number of icebreakers to accomplish its missions in the Polar Regions. Currently, the Coast Guard has only one operational [polar] icebreaker [i.e., *Healy*], making it necessary for the United States to contract with foreign nations to perform scientific, logistical, and supply activities. Without the necessary budgetary control and a sufficient number of icebreaking assets, the Coast Guard will not have the capability to perform all of its missions, will lose critical

[80] *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*, July 2010, pp. 10-13, 15.

[81] Source: Transcript of hearing.

> icebreaking expertise, and may be beholden to foreign nations to perform its statutory missions. The Coast Guard should improve its strategic approach to ensure that it has the long-term icebreaker capabilities needed to support Coast Guard missions and other national interests in the Arctic and Antarctic regions.[82]

Regarding current polar icebreaking capabilities for performing Arctic missions, the report states:

> The Coast Guard's icebreaking resources are unlikely to meet future demands. [The table below] outlines the missions that Coast Guard is unable to meet in the Arctic with its current icebreaking resources.

Arctic Missions Not Being Met

Requesting Agency	Missions Not Being Met
United States Coast Guard	—Fisheries enforcement in Bering Sea to prevent foreign fishing in U.S. waters and overfishing
	—Capability to conduct search and rescue in Beaufort Sea for cruise line and natural resource exploration ships
	—Future missions not anticipated to be met: 2010 Arctic Winter Science Deployment
NASA	Winter access to the Arctic to conduct oceanography and study Arctic currents and how they relate to regional ice cover, climate, and biology
NOAA and NSF	Winter research
Department of Defense	Assured access to ice-impacted waters through a persistent icebreaker presence in the Arctic and Antarctic[83]

The report also states:

> Should the Coast Guard not obtain funding for new icebreakers or major service life extensions for its existing icebreakers with sufficient lead-time, the United States will have no heavy icebreaking capability beyond 2020 and no polar icebreaking capability of any kind by 2029. Without the continued use of icebreakers, the United States will lose its ability to maintain a presence in the Polar Regions, the Coast Guard's expertise to perform ice operations will continue to diminish, and missions will continue to go unmet.[84]

[82] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, p. 1 (Executive Summary). Report accessed September 21, 2011, at http://www.dhs.gov/xoig/assets/mgmtrpts/OIG_11-31_Jan11.pdf.

[83] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, p. 9.

[84] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, p. 10.

Regarding current polar icebreaking capabilities for performing Antarctic missions, the report states:

> The Coast Guard needs additional icebreakers to accomplish its missions in the Antarctic. The Coast Guard has performed the McMurdo Station resupply in Antarctica for decades, but with increasing difficulty in recent years. The Coast Guard's two heavy-duty icebreakers [i.e., *Polar Star* and *Polar Sea*] are at the end of their service lives, and have become less reliable and increasingly costly to keep in service….
>
> In recent years, the Coast Guard has found that ice conditions in the Antarctic have become more challenging for the resupply of McMurdo Station. The extreme ice conditions have necessitated the use of foreign vessels to perform the McMurdo break-in….
>
> As ice conditions continue to change around the Antarctic, two icebreakers are needed for the McMurdo break-in and resupply mission. Typically, one icebreaker performs the break-in and the other remains on standby. Should the first ship become stuck in the ice or should the ice be too thick for one icebreaker to complete the mission, the Coast Guard deploys the ship on standby. Since the Polar Sea and Polar Star are not currently in service, the Coast Guard has no icebreakers capable of performing this mission. [The table below] outlines the missions that will not be met without operational heavy-duty icebreakers.

Arctic Missions Not Being Met

Requesting Agency	Missions Not Being Met
NSF	Missions not anticipated to be met: 2010-2011 Operation Deep Freeze – McMurdo Station Resupply
Department of State	Additional inspections of foreign facilities in Antarctica to enforce the Antarctic Treaty and ensure facilities' environment compliance[85]

The report's conclusion and recommendations were as follows:

> **Conclusion**
>
> With an aging fleet of three icebreakers, one operational and two beyond their intended 30-year service life, the Coast Guard is at a critical crossroads in its Polar Icebreaker Maintenance, Upgrade, and Acquisition Program. It must clarify its mission requirements, and if the current mission requirements remain, the Coast Guard must determine the best method for meeting these requirements in the short and long term.
>
> **Recommendations**
>
> We recommend that the Assistant Commandant for Marine Safety, Security, and Stewardship:
>
> **Recommendation #1:** Request budgetary authority for the operation, maintenance, and upgrade of its icebreakers.

[85] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, pp. 10-11.

> **Recommendation #2:** In coordination with the Department of Homeland Security, request clarification from Congress to determine whether Arctic missions should be performed by Coast Guard assets or contracted vessels.
>
> **Recommendation #3:** In coordination with the Department of Homeland Security, request clarification from Congress to determine whether Antarctic missions should be performed by Coast Guard assets or contracted vessels.
>
> **Recommendation #4:** Conduct the necessary analysis to determine whether the Coast Guard should replace or perform service-life extensions on its two existing heavy-duty icebreaking ships.
>
> **Recommendation #5:** Request appropriations necessary to meet mission requirements in the Arctic and Antarctic.[86]

The report states that

> The Coast Guard concurred with all five of the recommendations and is initiating corrective actions. We consider the recommendations open and unresolved. The Coast Guard provided information on some of its ongoing projects that will address the program needs identified in the report.[87]

2010 U.S. Arctic Research Commission Report

A May 2010 report from the U.S. Arctic Research Commission (USARC) on goals and objectives for Arctic research for 2009-2010 stated:

> To have an effective Arctic research program, the United States must invest in human capital, research platforms, and infrastructure, including new polar class icebreakers, and sustained sea, air, land, space, and social observing systems…. The Commission urges the President and Congress to commit to replacing the nation's two polar class icebreakers.[88]

2007 National Research Council Report

A 2007 National Research Council (NRC) report, *Polar Icebreakers in a Changing World: An Assessment of U.S. Needs*, assessed roles and future needs for Coast Guard polar icebreakers.[89] The study was required by report language accompanying the FY2005 DHS appropriations act (H.R. 4567/P.L. 108-334).[90] The study was completed in 2006 and published in 2007. Some

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[86] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, p. 12.

[87] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, p. 13.

[88] U.S. Arctic Research Commission, *Report on Goals and Objectives for Arctic Research 2009-2010, May 2010*, p. 4. Accessed online December 5, 2011, at http://www.arctic.gov/publications/usarc_2009-10_goals.pdf.

[89] National Research Council, *Polar Icebreakers in a Changing World, An Assessment of U.S. Needs*, Washington, 2007, 122 pp.

[90] H.R. 4567/P.L. 108-334 of October 18, 2004. The related Senate bill was S. 2537. The Senate report on S. 2537 (S.Rept. 108-280 of June 17, 2004) stated:

> The Committee expects the Commandant to enter into an arrangement with the National Academy of Sciences to conduct a comprehensive study of the role of Coast Guard icebreakers in supporting United States operations in the Antarctic and the Arctic. The study should include different scenarios for continuing those operations including service life extension or replacement of existing Coast Guard icebreakers and alternative methods that do not use Coast Guard icebreakers. The study should also address changes in the roles and missions of Coast Guard icebreakers in support

(continued...)

sources refer to the study as the 2006 NRC report. The report made the following conclusions and recommendations:

> Based on the current and future needs for icebreaking capabilities, the [study] committee concludes that the nation continues to require a polar icebreaking fleet that includes a minimum of three multimission ships [like the Coast Guard's three current polar icebreakers] and one single-mission [research] ship [like Palmer]. The committee finds that although the demand for icebreaking capability is predicted to increase, a fleet of three multimission and one single-mission icebreakers can meet the nation's future polar icebreaking needs through the application of the latest technology, creative crewing models, wise management of ice conditions, and more efficient use of the icebreaker fleet and other assets. The nation should immediately begin to program, design, and construct two new polar icebreakers to replace the POLAR STAR and POLAR SEA.
>
> Building only one new polar icebreaker is insufficient for several reasons. First, a single ship cannot be in more than one location at a time. No matter how technologically advanced or efficiently operated, a single polar icebreaker can operate in the polar regions for only a portion of any year. An icebreaker requires regular maintenance and technical support from shipyards and industrial facilities, must reprovision regularly, and has to effect periodic crew changeouts. A single icebreaker, therefore, could not meet any reasonable standard of active and influential presence and reliable, at-will access throughout the polar regions.
>
> A second consideration is the potential risk of failure in the harsh conditions of polar operations. Despite their intrinsic robustness, damage and system failure are always a risk and the U.S. fleet must have enough depth to provide backup assistance. Having only a single icebreaker would necessarily require the ship to accept a more conservative operating profile, avoiding more challenging ice conditions because reliable assistance would not be available. A second capable icebreaker, either operating elsewhere or in homeport, would provide ensured backup assistance and allow for more robust operations by the other ship.
>
> From a strategic, longer-term perspective, two new Polar class icebreakers will far better position the nation for the increasing challenges emerging in both polar regions. A second new ship would allow the U.S. Coast Guard to reestablish an active patrol presence in U.S. waters north of Alaska to meet statutory responsibilities that will inevitably derive from increased human activity, economic development, and environmental change. It would allow response to emergencies such as search-and-rescue cases, pollution incidents, and assistance to ships threatened with grounding or damage by ice. Moreover, a second new ship will leverage the possibilities for simultaneous operations in widely disparate geographic areas (e.g., concurrent operations in the Arctic and Antarctic),

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(...continued)

> of future marine operations in the Arctic that may develop due to environmental change, including the amount and kind of icebreaking support that may be required in the future to support marine operations in the Northern Sea Route and the Northwest Passage; the suitability of the Polar Class icebreakers for these new roles; and appropriate changes in existing laws governing Coast Guard icebreaking operations and the potential for new operating regimes. The study should be submitted to the Committee no later than September 30, 2005.

The conference report on H.R. 4567 (H.Rept. 108-774 of October 9, 2004) stated:

> As discussed in the Senate report and the Coast Guard authorization bill for fiscal year 2005, the conferees require the National Academy of Sciences to study the role of Coast Guard icebreakers.

The earlier House report on H.R. 4567 (H.Rept. 108-541 of June 15, 2004) contained language directing a similar report from the Coast Guard rather than the National Academies. (See the passage in the House report under the header "Icebreaking.")

> provide more flexibility for conducting Antarctic logistics (as either the primary or the secondary ship for the McMurdo break-in), allow safer multiple-ship operations in the most demanding ice conditions, and increase opportunities for international expeditions. Finally, an up-front decision to build two new polar icebreakers will allow economies in the design and construction process and provide a predictable cost reduction for the second ship….
>
> The [study] committee finds that both operations and maintenance of the polar icebreaker fleet have been underfunded for many years, and the capabilities of the nation's icebreaking fleet have diminished substantially. Deferred long-term maintenance and failure to execute a plan for replacement or refurbishment of the nation's icebreaking ships have placed national interests in the polar regions at risk. The nation needs the capability to operate in both polar regions reliably and at will. Specifically, the committee recommends the following:
>
> - The United States should continue to project an active and influential presence in the Arctic to support its interests. This requires U.S. government polar icebreaking capability to ensure year-round access throughout the region.
> - The United States should continue to project an active and influential presence in the Antarctic to support its interests. The nation should reliably control sufficient icebreaking capability to break a channel into and ensure the maritime resupply of McMurdo Station.
> - The United States should maintain leadership in polar research. This requires icebreaking capability to provide access to the deep Arctic and the ice-covered waters of the Antarctic.
> - National interests in the polar regions require that the United States immediately program, budget, design, and construct two new polar icebreakers to be operated by the U.S. Coast Guard.
> - To provide continuity of U.S. icebreaking capabilities, the POLAR SEA should remain mission capable and the POLAR STAR should remain available for reactivation until the new polar icebreakers enter service.
> - The U.S. Coast Guard should be provided sufficient operations and maintenance budget to support an increased, regular, and influential presence in the Arctic. Other agencies should reimburse incremental costs associated with directed mission tasking.
> - Polar icebreakers are essential instruments of U.S. national policy in the changing polar regions. To ensure adequate national icebreaking capability into the future, a Presidential Decision Directive should be issued to clearly align agency responsibilities and budgetary authorities.[91]

The Coast Guard stated in 2008 that it "generally supports" the NRC report, and that the Coast Guard "is working closely with interagency partners to determine a way forward with national polar policy that identifies broad U.S. interests and priorities in the Arctic and Antarctic that will ensure adequate maritime presence to further these interests. Identification and prioritization of U.S. national interests in these regions should drive development of associated USCG [U.S. Coast Guard] capability and resource requirements." The Coast Guard also stated: "Until those broad

[91] National Research Council, *Polar Icebreakers in a Changing World, An Assessment of U.S. Needs*, Washington, 2007, pp. 2-3.

U.S. interests and priorities are identified, the current USG [U.S. Government] polar icebreaking fleet should be maintained in an operational status."[92]

[92] Coast Guard point paper provided to CRS on February 12, 2008, and dated with the same date, providing answers to questions from CRS concerning polar icebreaker modernization.

Appendix B. Funding Level in AC&I Account

This appendix presents additional discussion of the funding level of the Coast Guard's Acquisition, Construction, and Improvements (AC&I) account.

Funding the AC&I account at a level of about $1 billion per year, the Coast Guard has testified, would make it difficult to fund various Coast Guard acquisition projects. Coast Guard plans, for example, call for procuring Offshore Patrol Cutters (OPCs) at an eventual rate of two per year.[93] If each OPC costs roughly $400 million (a current estimate), procuring two OPCs per year in an AC&I account of about $1 billion per year would leave about $200 million per year for all other AC&I-funded programs.

At an October 4, 2011, hearing on the Coast Guard's major acquisition programs before the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee, the following exchange occurred:

> REPRESENATIVE FRANK LOBIONDO:
>
> Can you give us your take on what percentage of value must be invested each year to maintain current levels of effort and to allow the Coast Guard to fully carry out its missions?
>
> ADMIRAL ROBERT J. PAPP, COMMANDANT OF THE COAST GUARD:
>
> I think I can, Mr. Chairman. Actually, in discussions and looking at our budget—and I'll give you rough numbers here, what we do now is we have to live within the constraints that we've been averaging about $1.4 billion in acquisition money each year.
>
> If you look at our complete portfolio, the things that we'd like to do, when you look at the shore infrastructure that needs to be taken care of, when you look at renovating our smaller icebreakers and other ships and aircraft that we have, we've done some rough estimates that it would really take close to about $2.5 billion a year, if we were to do all the things that we would like to do to sustain our capital plant.
>
> So I'm just like any other head of any other agency here, as that the end of the day, we're given a top line and we have to make choices and tradeoffs and basically, my tradeoffs boil down to sustaining frontline operations balancing that, we're trying to recapitalize the Coast Guard and there's where the break is and where we have to define our spending.[94]

An April 18, 2012, blog entry stated:

> If the Coast Guard capital expenditure budget remains unchanged at less than $1.5 billion annually in the coming years, it will result in a service in possession of only 70 percent of the assets it possesses today, said Coast Guard Rear Adm. Mark Butt.
>
> Butt, who spoke April 17 [2012] at [a] panel [discussion] during the Navy League Sea Air Space conference in National Harbor, Md., echoed Coast Guard Commandant Robert Papp in stating that the service really needs around $2.5 billion annually for procurement.[95]

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[93] For more on the OPC program, see CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by (name redacted) .

[94] Source: Transcript of hearing.

[95] David Perera, "The Coast Guard Is Shrinking," *FierceHomelandSecurity.com*, April 18, 2012, accessed July 20, 2012, at http://www.fiercehomelandsecurity.com/story/coast-guard-shrinking/2012-04-18.

At a May 9, 2012, hearing on the Coast Guard's proposed FY2013 budget before the Homeland Security subcommittee of the Senate Appropriations Committee, Admiral Papp testified, "I've gone on record saying that I think the Coast Guard needs closer to $2 billion dollars a year [in acquisition funding] to recapitalize—[to] do proper recapitalization."[96]

At a May 14, 2013, hearing on the Coast Guard's proposed FY2014 budget before the Homeland Security subcommittee of the Senate Appropriations Committee, Admiral Papp stated the following regarding the difference between having about $1.0 billion per year and having about $1.5 billion per year in the AC&I account:

> Well, Madam Chairman, $500 million—a half a billion dollars—is real money for the Coast Guard. So, clearly, we had $1.5 billion in the [FY]'13 budget. It doesn't get everything I would like, but it—it gave us a good start, and it sustained a number of projects that are very important to us.
>
> When we go down to the $1 billion level this year, it gets my highest priorities in there, but we have to either terminate or reduce to minimum order quantities for all the other projects that we have going.
>
> If we're going to stay with our program of record, things that have been documented that we need for our service, we're going to have to just stretch everything out to the right. And when we do that, you cannot order in economic order quantities. It defers the purchase. Ship builders, aircraft companies—they have to figure in their costs, and it inevitably raises the cost when you're ordering them in smaller quantities and pushing it off to the right.
>
> Plus, it almost creates a death spiral for the Coast Guard because we are forced to sustain older assets—older ships and older aircraft—which ultimately cost us more money, so it eats into our operating funds, as well, as we try to sustain these older things.
>
> So, we'll do the best we can within the budget. And the president and the secretary have addressed my highest priorities, and we'll just continue to go on the—on an annual basis seeing what we can wedge into the budget to keep the other projects going.[97]

At a March 12, 2014, hearing on the Coast Guard's proposed FY2015 budget before the Homeland Security subcommittee of the House Appropriations Committee, Admiral Papp stated:

> Well, that's what we've been struggling with, as we deal with the five-year plan, the capital investment plan, is showing how we are able to do that. And it will be a challenge, particularly if it sticks at around $1 billion [per year]. As I've said publicly, and actually, I said we could probably—I've stated publicly before that we could probably construct comfortably at about 1.5 billion [dollars] a year. But if we were to take care of all the

[96] Source: transcript of hearing. Papp may have been referring to remarks he made to the press before giving his annual state of the Coast Guard speech on February 23, 2012, in which reportedly stated that the Coast Guard would require about $2 billion per year in acquisition funding to fully replace its current assets. (See Adam Benson, "Coast Guard Cutbacks Will Cost 1,000 Jobs," *Norwich Bulletin*, February 23, 2012, accessed May 31, 2012, at http://www.norwichbulletin.com/news/x1138492141/Coast-Guard-cutbacks-will-cost-1-000-jobs#axzz1wSDAFCzX. See also "Coast Guard Leader Calls For More Ships," *MilitaryFeed.com*, February 24, 2012, accessed May 31, 2012, at http://militaryfeed.com/coast-guard-leader-calls-for-more-ships-5/; Associated Press, "Coast Guard Commandant Calls for New Ships," *TheLog.com*, March 10, 2012, accessed May 31, 2012, at http://www.thelog.com/SNW/Article/Coast-Guard-Commandant-Calls-for-New-Ships-to-Replace-Aging-Fleet; Mickey McCarter, "Congress Poised to Give Coast Guard More Money Than Requested for FY2013," *HSToday.us*, May 10, 2012, accessed May 31, 2012, at http://www.hstoday.us/focused-topics/customs-immigration/single-article-page/congress-poised-to-give-coast-guard-more-money-than-requested-for-fy-2013.html.) See also "Interview, Adm. Robert Papp, US Coast Guard Commandant," *Defense News*, November 11, 2013, p. 30.

[97] Transcript of hearing. The remarks were made in response to a question from Senator Mary Landrieu.

> Coast Guard's projects that are out there, including shore infrastructure that that fleet that takes care of the Yemen [sic: inland] waters is approaching 50 years of age, as well, but I have no replacement plan in sight for them because we simply can't afford it. Plus, we need at some point to build a polar icebreaker. Darn tough to do all that stuff when you're pushing down closer to 1 billion [dollars per year], instead of 2 billion [dollars per year].
>
> As I said, we could fit most of that in at about the 1.5 billion [dollars per year] level, but the projections don't call for that. So we are scrubbing the numbers as best we can.[98]

At a March 24, 2015, hearing on the Coast Guard's proposed FY2016 budget before the Homeland Security subcommittee of the House Appropriations Committee, Admiral Paul Zukunft, Admiral Papp's successor as Commandant of the Coast Guard, stated:

> I look back to better years in our acquisition budget when we had a—an acquisition budget of—of $1.5 billion. That allows me to move these programs along at a much more rapid pace and, the quicker I can build these at full-rate production, the less cost it is in the long run as well. But there's an urgent need for me to be able to deliver these platforms in a timely and also in an affordable manner. But to at least have a reliable and a predictable acquisition budget would make our work in the Coast Guard much easier. But when we see variances of—of 30, 40% over a period of three or four years, and not knowing what the Budget Control Act may have in store for us going on, yes, we are treading water now but any further reductions, and now I am—I am beyond asking for help. We are taking on water.[99]

At an earlier point in the hearing, Zukunft stated:

> The concern is our ability to recapitalize and to recapitalize at—at a pace that would make it affordable. We—we've had unpredictable budgets. I've been through 21 continuing resolutions in the last four years. Under a continuing resolution it prohibits me from engaging in—major acquisition programs so a predictable, reliable budget, to have an acquisition budget that is equally predictable and doesn't experience a 35 to 38% reduction over a period of three or four years, at a point in time where I have a confluence of finishing the national security cutter [NSC]. I'd need to bring on the offshore patrol cutter [OPC], finish out the fast-response cutter [FPC] by 2020,[100] and that doesn't even touch the Arctic domain. There—there is no money for me to even address the Arctic. And so those are the challenges that I face and I—I could not be more clear is that a one point, you know, [a] $1 billion AC&I (ph) budget will not address these concerns that are—they're not even over the horizon. They are now in front of me...
>
> REPRESENTATIVE CHRIS STEWART:
>
> (Inaudible)
>
> ZUKUNFT:
>
> ... staring me in the face today.[101]

Although the annual amounts of acquisition funding that the Coast Guard has received in recent years are one potential guide to what Coast Guard acquisition funding levels might or should be in coming years, there may be other potential guides. For example, one could envision potential guides that focus on whether Coast Guard funding for ship acquisition and sustainment is

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[98] Transcript of hearing.

[99] Transcript of hearing. The remarks were made in response to a question from Representative John Culberson.

[100] For more on the NSC, OPC, and FRC programs, see CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by (name redacted).

[101] Transcript of hearing. The remarks were made in response to a question from Representative Chris Stewart.

commensurate with Coast Guard funding for the personnel who in many cases will operate the ships. Observations that might be made in connection with this example based on the Coast Guard and Navy budget submissions include the following:

- Using figures from the FY2014 budget submission, the Coast Guard has about 12.9% as many active-duty personnel as the Navy.[102] If the amount of funding for the surface ship acquisition and sustainment part of the AC&I account were equivalent to 12.9% of the amount of funding in the Navy's shipbuilding account, this part of the AC&I account would be about $1.8 billion per year.[103] Navy surface ship acquisition, unlike Coast Guard surface ship acquisition, includes substantial numbers of large and complex ships, including nuclear-powered aircraft carriers, highly capable surface combatants, and large amphibious and auxiliary ships. Accounting for this difference in Navy and Coast Guard surface ship acquisition by reducing the $1.8 billion figure by, say, one-half or one-third would produce an adjusted figure of about $900 million to about $1.2 billion per year.
- Again using figures from the FY2014 budget submission, funding in the Navy's shipbuilding account is equivalent to about 51% of the Navy's funding for active-duty personnel.[104] If Coast Guard funding for surface ship acquisition and sustainment were equivalent to 51% of Coast Guard funding for military pay and allowances, this part of the AC&I account would be about $1.7 billion per year.[105] Reducing the $1.7 billion figure by, say, one-half or one-third to account for differences in the types of surface ships acquired by the Navy and Coast Guard (see previous bullet point) would produce an adjusted figure of about $850 million to about $1.1 billion per year.

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[102] The Coast Guard for FY2014 appears to be requesting an active-duty end strength—the number of active-duty military personnel—of 41,594 (measured by the Coast Guard in full-time equivalent [FTE] positions); the Navy for FY2014 is requesting an active-duty end strength of 323,600.

[103] The Navy's proposed FY2014 budget requests $14,078 million for the Shipbuilding and Conversion, Navy (SCN) appropriation account.

[104] The Navy's proposed FY2014 budget requests $27,824 million for the Military Personnel, Navy (MPN) appropriation account.

[105] The Coast Guard's proposed FY2014 budget requests $3,425.3 million for military pay and allowances.

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