



TESTIMONY OF

Randolph “Tex” Alles
Deputy Under Secretary for Management
U.S. Department of Homeland Security

For a Hearing

BEFORE

United States House of Representatives
Committee on Homeland Security
Subcommittee on Transportation and Maritime Security

ON

“Building the Fleet: Assessing the Department of Homeland Security’s Role
in the United States Coast Guard’s Acquisitions Process”

May 7, 2024
Washington, D.C.

INTRODUCTION

Chairman Gimenez, Ranking Member Thanedar, and distinguished Members of the Subcommittee:

It is a privilege to appear before you today to represent the Department of Homeland Security (DHS or the Department) and its Management Directorate.

My name is Randolph “Tex” Alles, and I have served as the Deputy Under Secretary for Management (DUSM) since July 2019. In my capacity as DUSM, I oversee Department-wide management and oversight for all mission support functions, such as Information Technology, budget and financial management, procurement, acquisition, human capital, security, and asset management. In addition to my role as DUSM, I serve as the Chief Acquisition Officer for the Department.

I am pleased to be joined today by my colleague from the United States Coast Guard (USCG), Vice Admiral Paul Thomas, Deputy Commandant for Mission Support. The Management Directorate works collaboratively with the USCG to oversee the acquisition of maritime and aviation fleets needed by our frontline employees to protect our homeland.

As Chief Acquisition Officer for the Department, I recognize the critical role effective acquisition management plays in meeting mission needs. Being proactive in security efforts across the Department’s various mission sets requires the acquisition community to work hard to streamline efforts without sacrificing our ability to execute the Department’s missions. DHS’s acquisition programs vary in size, scope, and cost. Collectively, the Department’s acquisition program portfolio works together to provide security for our nation’s borders, both land and maritime.

As the Commandant of the USCG has previously conveyed, we have never experienced a greater demand for USCG services, and we anticipate this demand to grow in the future. At the Department, we are focused on facilitating the delivery of capabilities to meet these demands and confront the dynamic and complex challenges faced by USCG personnel. New and more capable cutters; aircraft; boats; and command, control, and communications systems are required to support mission execution domestically and in some of the most challenging environments around the world, including the Polar Regions, Indo-Pacific region, and Persian Gulf.

Recapitalization of the USCG is an important priority of the Department, and we are focused on providing effective program oversight and governance to ensure that investment in our critical assets has the greatest opportunity to meet the mission needs, at an affordable cost, and in a timely manner to support our personnel.

THE HOMELAND SECURITY ACQUISITION ENTERPRISE

As the Chief Acquisition Officer of the Department, I am responsible for the management, administration, and oversight of the Department’s acquisition programs and acquisition management systems. I am proud to lead a talented team of professionals that facilitate the

acquisition of necessary capital assets, infrastructure, and systems across all of the Department's operational Components. These acquisitions require executable strategies that consider the need to plan and scope acquisitions before work begins; to oversee the design and production processes; and to prepare future crews and the maintenance community for the delivery and future operation of new capabilities. By teaming with the Component Acquisition Executives, program managers, and other acquisition professionals, the Department's goal is to enhance these acquisition activities, while providing the appropriate number of checks and balances to promote better outcomes in achieving program success.

U.S. COAST GUARD SHIPBUILDING

Among the active USCG shipbuilding efforts, DHS is currently governing six of these programs as major acquisitions, either as Level 1 programs with lifecycle costs exceeding \$1 billion or Level 2 programs with lifecycle costs exceeding \$300 million. These programs are in various stages of the Department's Acquisition Lifecycle Framework, from established programs at the tail end of production, such as our National Security Cutters (NSC) and Fast Response Cutters (FRC), to more recent programs in an earlier phase of the acquisition lifecycle, such as the Polar Security Cutters (PSC) and Waterway Commerce Cutters (WCC).

Of the USCG's white-hull cutter fleet, the NSC is the largest and most technologically sophisticated. The USCG accepted delivery of the 10th NSC on October 13, 2023, and construction of the 11th and final NSC is currently underway in Pascagoula, Mississippi. We also continue to deliver FRCs into the fleet. Just this March, USCG accepted delivery of the 56th of the planned 65 FRCs. The fiscal year (FY) 2024 appropriations provided funding for another two FRCs which we plan to put under contract soon.

The Offshore Patrol Cutter (OPC) remains a top acquisition priority for the Department and is vital to recapitalizing the capability provided by our legacy fleet of 210-foot and 270-foot Medium Endurance Cutters (MEC). The program is progressing, with production of OPCs 1-4 underway with the Stage 1 contractor. Additionally, we are continuing with design activities on the Stage 2 contract, which will lead to the future production of up to 11 additional OPCs. As a bridging strategy to maintain mission capabilities until the OPCs are delivered, USCG has undertaken a service life extension program that will address key systems and component obsolescence on board the legacy MECs, many of which already exceed 50 years in service.

We are also investing in the acquisition of the nation's first new heavy polar icebreakers in over four decades. PSC design activities are ongoing, and initial long lead-time material has been delivered to the shipyard. Recognizing the critical need for these assets, the USCG is working closely with the prime contractor to mitigate schedule risks and ensure production readiness. When fully operational, PSCs will provide the global reach and icebreaking capability necessary to project U.S. sovereignty and influence, conduct missions in the high latitudes, and advance our national interests in the Arctic and Antarctic regions. The USCG Cutter POLAR STAR is the nation's only remaining heavy polar icebreaker. She was commissioned in 1976, along with her sister ship, POLAR SEA. The PSC will be considerably larger at 22,900 tons displacement compared to the 13,200-ton displacement of the previous polar icebreakers, to meet modern habitability and environmental standards and provide additional multi-mission spaces.

On October 5, 2022, the USCG awarded the WCC contract for the design and future production of the river buoy tender and inland construction tender variants. The contract includes options for production of up to 27 cutters, and a separate effort is planned to deliver three inland buoy tenders to achieve a total fleet of 30 WCCs. The prime contractor began design activities earlier last year. Investment in our inland fleet is critical to the continued operation of the nation's Marine Transportation System, which accounts for more than \$4 trillion in annual economic activity. The legacy fleet is approaching obsolescence, and maintenance costs are rising. Continued progress toward delivering these new assets and replacing the legacy fleet, which has an average age of over 55 years, is critical to maintaining the USCG's capability to execute this important mission.

SHIPBUILDING CHALLENGES

The USCG's new shipbuilding programs include ongoing construction at five private shipyards across the United States, with a preponderance of the activities for building the major cutters centered in the Gulf Coast region of Louisiana, Mississippi, Alabama, and Florida. We recognize that the U.S. shipbuilding industry as a whole is facing pressure from a diminished industrial base capacity. The main issues limiting private shipbuilders in the long term lies in lack of personnel, rising costs of materials, and fluctuating acquisition priorities. Along with the rest of the industry, our USCG programs are also seeing challenges caused by these issues. Two of our highest priority programs – the OPC and PSC – have faced, and are continuing to face, significant schedule delays and cost increases.

While it is common to see cost growth on first-in-class ships across the industry, the OPC program experienced unprecedented events early in the design process. The catastrophic effects of Hurricane Michael in 2018 as well as COVID-19-era inflation have resulted in the acquisition cost estimate increasing significantly since the initial estimate in 2012. We have increased Department-level oversight of the OPC Program, and I am briefed by the Program Manager regularly to stay up to date on the program status. The USCG is working closely with the OPC shipbuilders to establish an updated baseline and schedule to determine what it will realistically take to get the first and follow-on OPCs in operation.

The PSC program is now years behind the original schedule, without having attained the level of maturity we require prior to authorizing the start of construction. In addition to the general lack of U.S. experience designing and building polar icebreakers, the prime contractor suffered from organizational instability and has undergone managerial restructuring following its acquisition by a competitor shipyard in 2022. With the new management in place, we are now expecting to complete the Critical Design Review later this year, allowing us to start construction soon thereafter. In addition to enhancing our oversight and analysis of design metrics, in May 2022, I approved the USCG's plan to begin construction on up to eight prototype units of the cutter that will eventually be incorporated into the construction of the first icebreaker. These prototype units are intended to allow the yard to exercise their fabrication processes in a controlled environment and are expected to reduce future production and schedule risk. Four of the eight prototype units are now under construction and are, as we hoped, yielding valuable lessons for the craft workers to incorporate into the future full production. Additionally, the USCG received \$125 million in FY 2024 appropriations for the acquisition of a commercially available icebreaker to increase its

near-term presence in the Arctic. We are streamlining the processes to acquire this capability with the goal of providing some degree of operational presence in the Arctic within the next 24 months.

CONCLUSION

Chairman Gimenez, Ranking Member Thanedar, and distinguished Members of the Subcommittee, thank you again for your attention to this important mission and for the opportunity to discuss the Management Directorate's governance of critical USCG shipbuilding efforts. As the legacy cutters continue to age, maintaining the older ships will be more of a challenge due to cost and obsolescence. With that in mind, we continually strive to improve our acquisition process with a focus on meeting mission performance, at an affordable cost, and within the required schedule. I look forward to answering your questions.



Statement of

Ronald O'Rourke
Specialist in Naval Affairs

Before

Committee on Homeland Security
Subcommittee on Transportation and Maritime Security
U.S. House of Representatives

Hearing on

**“Building the Fleet: Assessing the Department
of Homeland Security’s Role in the United
States Coast Guard’s Acquisitions Process”**

May 7, 2024

Congressional Research Service

7-5700

www.crs.gov

<Product Code>

Introduction

Chairman Giménez, Ranking Member Thanedar, thank you for the opportunity to appear before you today to testify on “Building the Fleet: Assessing the Department of Homeland Security’s Role in the United States Coast Guard’s Acquisitions Process.” As part of my work for Congress as the CRS specialist for naval issues, a position I have held since 1984, I have been tracking Coast Guard shipbuilding programs since 1998 (i.e., for the last 26 years).¹ I currently maintain CRS reports on the Polar Security Cutter (PSC) program;² the National Security Cutter (NSC), Offshore Patrol Cutter (OPC), and Fast Response Cutter (FRC) programs;³ as well as the Waterways Commerce Cutter (WCC) program.⁴ My biography is in the **Appendix** at the end of this statement.

As requested, my testimony focuses primarily on the PSC program. I initiated the CRS report on what is now referred to as the PSC program in 2008, and have since updated it periodically (usually multiple times each year). I last testified before this subcommittee on July 18, 2023, at a hearing on strategic competition in the Arctic.⁵ My work on the PSC program supports my efforts as the head of the CRS Arctic team and the coordinator of the CRS overview report on the Arctic, which CRS initiated in 2010.⁶ Parts of this testimony are adapted from the CRS report on the PSC program and the CRS report on the NSC, OPC, and FRC programs.

Polar Security Cutter (PSC) Program

Two key issues for the Polar Security Cutter (PSC) program are cost growth and schedule delay.

Cost Growth

Coast Guard and Navy estimates of PSC procurement costs have increased about 39% since the April 2019 PSC program contract award:

- At a March 28, 2019, hearing on the Coast Guard’s proposed FY2020 budget, then-Coast Guard Commandant Admiral Karl Schultz testified that as of that date, the cost of the first PSC was estimated at \$925 million to \$940 million, and that the cost of the second and third PSCs would be in the range of \$700 million each,⁷ producing an estimated three-ship total of about \$2,325 million to \$2,340 million (i.e., about \$2.3 billion).
- As shown in the CRS report on the PSC program, the most recent estimate provided by the Coast Guard to CRS is for the first PSC to cost \$1,297 million (i.e., about \$1.3 billion), the second PSC to cost \$921 million, and the third PSC to cost \$1,017 million (i.e., about \$1.0 billion), producing an estimated three ship total \$3,235 million (i.e.,

¹ See CRS Report 98-830 F, *Coast Guard Integrated Deepwater System: Background and Issues for Congress*, by Ronald O’Rourke (first version October 5, 1998).

² CRS Report RL34391, *Coast Guard Polar Security Cutter (Polar Icebreaker) Program: Background and Issues for Congress*, by Ronald O’Rourke.

³ CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by Ronald O’Rourke.

⁴ CRS In Focus IF11672, *Coast Guard Waterways Commerce Cutter (WCC) Program: Background and Issues for Congress*, by Ronald O’Rourke.

⁵ CRS Testimony TE10084, *Strategic Competition in the Arctic*, by Ronald O’Rourke.

⁶ CRS Report R41153, *Changes in the Arctic: Background and Issues for Congress*, coordinated by Ronald O’Rourke.

⁷ Source: CQ transcript of the hearing.

about \$3.2 billion),⁸ a total that is about 39% higher than the total from the March 28, 2019, testimony.

Even with this 39% increase, PSC procurement costs still appear to still be significantly underestimated. At least five potential factors could increase estimated PSC procurement costs from the March 2019 figures to figures that are significantly above the current estimate:

- **The actual PSC design is larger than the government’s indicative design.** The design chosen for the PSC is about 35% larger in terms of light-ship displacement than the indicative design (i.e., the government’s in-house notional design) that informed earlier Navy and Coast Guard cost estimating for the program. Adjusting for this larger design might incur an approximate 35% increase in estimated PSC procurement costs over the costs estimated at the time of the April 2019 PSC contract award.
- **The Navy has frequently underestimated lead ship costs.** As detailed by the Congressional Budget Office (CBO)⁹ and the Government Accountability Office (GAO),¹⁰ the costs of lead ships in Navy shipbuilding programs have exceeded the Navy’s estimates. Cost growth on Navy lead ships, CBO analysis shows, has ranged from a few percent to about 150%, with the weighted average figure for the 19 ship classes examined by CBO being 25%, and the unweighted average being 40%.¹¹ Many of these 19 cases involve lead ships whose light-ship displacements were not underestimated, meaning that the cost growth resulted from factors other than the one described in the previous bullet point.
- **Recent inflation in shipbuilding.** Shipbuilding, like other sectors of defense procurement and the U.S. economy in general, has experienced significant inflation since the start of the COVID-19 pandemic due to supply chain disruptions and other impacts. The Navy states “the residual effects of inflationary pressures of the past few years, workforce challenges, plus increased labor and supply costs across the defense enterprise, all drove costs associated with our shipbuilding account up roughly 20% over the last couple of years.”¹² This inflation has increased the estimated procurement costs of multiple Navy shipbuilding programs. Within Coast Guard shipbuilding, the estimated unit procurement cost of an FRC has increased from \$60 million in the Coast Guard’s enacted FY2021 appropriation to \$100 million in the Coast Guard’s FY2024 unfunded requirements list and FY2025 budget submission, although not all of the increase is necessarily due to the recent inflation in shipbuilding.
- **Potential need for additional increases in worker wages and benefits.** Shipyards and associated supplier firms face challenges in recruiting and retaining new workers, in part because wages and benefits in service and retail jobs have grown more in recent years than have wages and benefits at shipbuilders and supplier firms.¹³ As a result, workers are now more likely to choose service and retail jobs, where the work, while paying less than

⁸ Source: U.S. Coast Guard email to CRS, March 26, 2024, which stated that costs shown are from the PSC 2021 LCCE v3 (Life Cycle Cost Estimate, version 3). The Coast Guard stated in the email that the 2021 LCCE v3 is the Coast Guard’s current model for estimated PSC procurement costs.

⁹ See CBO, *An Analysis of the Navy’s Fiscal Year 2024 Shipbuilding Plan*, October 2023, p. 34 (Figure 10).

¹⁰ See Government Accountability Office, *Navy Shipbuilding[.] Past Performance Provides Valuable Lessons for Future Investments*, GAO-18-238SP, June 2018, p. 8.

¹¹ See CBO, *An Analysis of the Navy’s Fiscal Year 2024 Shipbuilding Plan*, October 2023, p. 34 (Figure 10).

¹² Department of the Navy, *Highlights of the Department of the Navy FY 2025 Budget*, 2024, page 1-12.

¹³ See, for example, Paul McLeary and Lee Hudson, “Navy Shipyards Compete with Fast Food, and Are Losing,” *Politico Pro*, April 9, 2024.

shipbuilding work, is more likely to be done in air-conditioned indoor settings, involve less heavy lifting or risk of serious injury, and take place in locations offering easier daily commutes.¹⁴ Reestablishing a larger differential in wages and benefits between shipbuilding jobs and service and retail jobs could require substantially increasing total wages and benefits for shipbuilding workers. Such a change could, in turn, substantially increase procurement costs for ships such as the PSC, since shipyard labor can account for roughly 40% of a military ship's total procurement cost. Increases in worker wages and benefits could also result from shipyards along the Gulf Coast competing against one another for available shipbuilding workers.¹⁵

- **Labor hours and absorption of fixed overhead costs.** Construction delays due to lower-than-anticipated shipyard worker productivity, supply chain issues, or other causes could increase the cost of the PSC because of the ship requiring a larger-than-anticipated number of labor hours to build (if worker productivity is an issue), and because the ship would absorb a portion of the shipyard's monthly fixed overhead costs for an increased number of months (an effect somewhat like the meter in a taxi continuing to run even when the taxi is stuck in traffic).

A simple (not compounded) sum of the potential percentage cost increases described in the first three bullet points above (using the 25% and 40% figures from the second bullet) comes to a potential percentage cost increase, if all three factors were to come fully into play, of 80% to 95% above the March 2019 figures.

Increasing the March 2019 figures by 80% would result in an estimated cost of \$1,665 million to \$1,692 million (i.e., about \$1.7 billion) for the lead ship and \$1,260 million (i.e., about \$1.3 billion) each for the second and third ships, producing an estimated three-ship total of \$4,185 million to \$4,212 million (i.e., about \$4.2 billion). This total is about 30% higher than the currently estimated total of \$3,235 million.

Increasing the March 2019 figures by 95% would result in an estimated cost of \$1,804 million to \$1,833 million (i.e., about \$1.8 billion) for the lead ship and \$1,365 million (i.e., about \$1.4 billion) each for the second and third ships, producing an estimated three-ship total of \$4,534 million to \$4,563 million (i.e., about \$4.5 billion to \$4.6 billion). This total is about 40% higher than the currently estimated total of \$3,235 million.

¹⁴ Ibid.

¹⁵ A January 22, 2024, press report states:

Rear Adm. Chad Jacoby, the assistant commandant of the Coast Guard for acquisition, said this month workforce challenges—specifically, needing more highly trained welders and design engineers—are contributing to delays on the Polar Security Cutter program at Bollinger Mississippi, formerly VT Halter Marine.

“If you look across all of our construction programs, every shipyard says they’re going to hire 1,000 or 2,000 more people prior to executing the contracts that we have in place. They all happen to be on the Gulf Coast, so if you add up all those numbers, it’s probably physically impossible for every one of those individual shipyards to hire 2,000 more people” to support on-time ship deliveries, Jacoby said on a Jan. 11 panel at the Surface Navy Association annual conference.

He told Defense News after the panel he is specifically concerned about Bollinger Mississippi in Pascagoula and its Polar Security Cutter; Eastern Shipbuilding Group in Panama City, Florida, which is building the first four Offshore Patrol Cutters; Austal USA in Mobile, Alabama, which will build the next 11 OPCs; and Birdon America, a Denver-based company that will build the Waterways Commerce Cutters with a number of Louisiana- and Alabama-based companies.

“It is one workforce across many states,” the admiral said of the Gulf Coast region. “As each shipyard says they’re going to hire people, they’re definitely competing against each other.”

(Megan Eckstein, “Coast Guard Ship Programs Facing Delays amid National Worker Shortage,” *Defense News*, January 22, 2024.)

The cost figures in the two previous paragraphs do not include any increases cost resulting from the factors outlined in the fourth and fifth bullet points above.

Percentage increases in estimated ship procurement costs comparable to the potential 80%-95% increase discussed above have recently occurred in certain Navy shipbuilding programs. The estimated procurement cost of the lead ship in the Navy's TAGOS-25 ocean surveillance ship program increased about 82% between the Navy's FY2023 and FY2024 budget submissions;¹⁶ the estimated procurement cost of the lead ship in the Navy's medium landing ship (LSM) program increased 43% between the Navy's FY2024 and FY2025 budget submissions;¹⁷ and the estimated procurement cost of the lead ship in the Navy's light replenishment oiler (TAOL) program increased 202% between the Navy's FY2024 and FY2025 budget submissions. An April 2024 CBO report on the procurement costs of LSMs estimates that LSMs will cost roughly 127% to 187% more than the Navy estimates.¹⁸

A procurement cost for the first PSC that is closer to \$2 billion than to \$1 billion would be comparable to the procurement cost of a Navy LPD-17 Flight II class amphibious ship, which is about \$2.0 billion. The LPD-17 Flight II design a little larger than the PSC design and has more expensive combat system equipment than the PSC.¹⁹

The Coast Guard could respond to potential PSC program cost growth by granting contract relief to the PSC shipbuilder, Bollinger Mississippi Shipbuilding, through a request for equitable adjustment (REA) or pursuant to P.L. 85-804 (as done for the builder of the first four OPCs, Eastern Shipbuilding Group).²⁰

Schedule Delay

The PSC program has fallen far behind its original schedule. The Coast Guard originally aimed to have the first PSC delivered in 2024, but the ship's estimated delivery date has been delayed repeatedly and is now expected to occur no earlier than FY2029.

A principal cause of the delay has been the time needed to achieve design maturity (i.e., to complete the detail design of the ship). The parent design strategy used for the PSC program (i.e., the strategy of creating the PSC design by modifying the design of an existing polar-capable ship) was intended by the Coast Guard and Navy to reduce the PSC's design time. Five years after contract award, the expected reduction in design time does not appear have been realized. The time needed to mature the PSC design suggests that the parent design used for the PSC program—the design for the new German polar icebreaker *Polar Stern II*—might now more closely resemble a parent design in name only (PDINO).²¹ In

¹⁶ For more on the TAGOS-25 program, see CRS In Focus IF11838, *Navy TAGOS-25 Ocean Surveillance Shipbuilding Program: Background and Issues for Congress*, by Ronald O'Rourke.

¹⁷ For more on the LSM program, see CRS Report R46374, *Navy Medium Landing Ship (LSM) (Previously Light Amphibious Warship [LAW]) Program: Background and Issues for Congress*, by Ronald O'Rourke.

¹⁸ Congressional Budget Office, *Acquisition Costs of the Navy's Medium Landing Ship*, April 2024, p. 1. For further discussion, see CRS Report R46374, *Navy Medium Landing Ship (LSM) (Previously Light Amphibious Warship [LAW]) Program: Background and Issues for Congress*, by Ronald O'Rourke.

¹⁹ Another consideration in comparing cost estimates for the first PSC and the LPD-17 Flight II design is that the first PSC is at the top of the learning curve for building the PSC design, while the cost of the LPD-17 Flight II design reflects learning curve benefits from producing earlier LPD-17 Flight I class ships. For more on the LPD-17 Flight II class program, see CRS Report R43543, *Navy LPD-17 Flight II and LHA Amphibious Ship Programs: Background and Issues for Congress*, by Ronald O'Rourke.

²⁰ For more on P.L. 85-804 and the contract relief granted in the OPC program to Eastern Shipbuilding Group under that law, see CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by Ronald O'Rourke.

²¹ The phrase *parent design in name only* (with the resulting acronym PDINO) is only one possible shorthand way of referring to the situation. One possible way to pronounce the acronym PDINO would be pa-DEE-no.

this regard, the PSC program appears somewhat similar to the Navy's Constellation (FFG-62) class frigate program, which the Navy initiated as a program that would use a parent design, but which observers might now characterize as having moved over time toward a PDINO situation.²² Limited numbers of available naval architects and design engineers within the United States also appear to have contributed to delays in maturing the PSC design.²³

With PSC design maturation now approaching 80%—the minimum typically targeted by the Navy before beginning construction of a lead ship—a principal option for substantially accelerating the construction of polar icebreakers for the Coast Guard would be to complete the maturation of the PSC design, begin building PSCs at the program's current shipbuilder, Bollinger Mississippi Shipbuilding, and at some later point introduce a second shipbuilder to build additional PSCs in parallel to those being built by Bollinger. The Coast Guard has testified that its most recent fleet mix analysis calls for a total of 8 to 9 polar-capable icebreakers, including 4 to 5 heavy polar icebreakers (i.e., PSCs), and 4 to 5 medium polar icebreakers. Given these figures and Bollinger's current contract to build up to three PSCs, one possible approach might be to introduce a second shipbuilder to build the fourth and fifth PSCs while Bollinger completes the first three. Another possible approach would be to have Bollinger build all 4 or 5 PSCs while accelerating the start date of the timeline for designing and building the medium polar icebreakers. This second approach could accelerate the date for completing the larger total of 8 to 9 heavy and medium polar icebreakers. These two alternatives are not the only possible approaches.

Arctic Security Cutter (ASC) Program

Of the 4 to 5 medium polar icebreakers called for in the Coast Guard's fleet mix analysis, one is to be the Commercially Available Polar Icebreaker (CAPI)—an existing, privately-owned ship that the Coast Guard plans to purchase and modify into a Coast Guard medium polar icebreaker, using funding appropriated for that purpose in the Coast Guard's FY2024 budget. The ship to be purchased and modified is *Aiviq*, a U.S.-registered ship that was originally built to serve as an Arctic oil-exploration support ship, and which has an icebreaking capability sufficient to serve as a Coast Guard medium polar icebreaker.²⁴ The other 3 to 4 medium polar icebreakers are to be new-construction ships referred to as Arctic Security Cutters (ASCs).

As discussed in the CRS report on the PSC program, one possible acquisition strategy for polar icebreakers would be to build PSCs and ASCs to a common basic design (i.e., the PSC design). A congressionally mandated July 2017 report from the National Academies of Sciences, Engineering, and Medicine (NASEM) on the acquisition and operation of polar icebreakers concluded that notional operational requirements for new medium polar icebreakers would result in ships similar in size to new

²² For more on the FFG-62 program, see CRS Report R44972, *Navy Constellation (FFG-62) Class Frigate Program: Background and Issues for Congress*, by Ronald O'Rourke. On the issue of the FFG-62's parent design strategy, the report states:

An April 2, 2024, press report states: "At one point the Constellation design shared about 85 percent commonality with the original [Italian-French] FREMM [Fregata Europea Multi-Missione parent] design, but the alterations [incorporated into the FFG-62 design] have brought that commonality down to under 15 percent, a person familiar with the changes told USNI News." If the FFG-62 design shares less than 15% commonality with the FREMM design, then some observers might characterize the FFG-62 program as having moved over time toward what might be termed a parent design in name only (PDINO) design approach.

²³ The January 22, 2024, press report quoted in footnote 15 mentions states (emphasis added): "Rear Adm. Chad Jacoby, the assistant commandant of the Coast Guard for acquisition, said this month workforce challenges—specifically, needing more highly trained welders and **design engineers**—are contributing to delays on the Polar Security Cutter program at Bollinger Mississippi, formerly VT Halter Marine."

²⁴ For further discussion of the CAPI program and *Aiviq*, see CRS Report RL34391, *Coast Guard Polar Security Cutter (Polar Icebreaker) Program: Background and Issues for Congress*, by Ronald O'Rourke.

heavy polar icebreakers. (The Coast Guard’s current medium polar icebreaker, *Healy*, is somewhat larger than *Polar Star*.) Given this probable similarity in size, the NASEM report recommended building a single medium polar icebreaker to the same basic design as three new heavy polar icebreakers. This approach, the report concluded, would reduce the cost of the medium icebreaker by avoiding the cost of developing a new design and by making the medium polar icebreaker the fourth ship on an existing production learning curve rather than the first ship on a new production learning curve.²⁵ The same general approach could be applied to procuring 4 to 5 PSCs and 3 to 4 ASCs.

At a November 29, 2023, hearing before the House Homeland Security Committee, Vice Admiral Peter Gautier, Coast Guard Deputy Commandant for Operations, stated that the Coast Guard in coming years will need to have “a mix of heavy icebreakers like the *Polar Star* and the Polar Security Cutters that we’re building now, and medium icebreakers like the *Healy* that have shallower drafts and can get into tighter spaces and shallower areas.”²⁶ Procuring ASCs as ships with shallower drafts could make it difficult or impossible for PSCs and ASCs to be built to a common basic design: A ship’s draft is a basic design characteristic; reducing the PSC design’s draft enough to meet the Coast Guard’s requirements might necessitate design changes that would effectively make it a different design.

Offshore Patrol Cutter (OPC) Program

Cost Growth

GAO testified in July 2023 that Offshore Patrol Cutter (OPC) program’s “acquisition cost estimate increase increased from \$12.5 billion to \$17.6 billion between the program’s 2012 and 2022 life-cycle cost estimates. The Coast Guard attributes the increase [of about 40%] to many factors, including restructuring the stage 1 contract—for OPCs 1 through 4—and recomputing the requirement for stage 2—OPCs 5 through 25—in response to a disruption caused by Hurricane Michael, and increased infrastructure costs for homeports and facilities, among other things.”²⁷

Of the five factors discussed earlier in connection with a potential increase in PSC procurement costs, two of them in particular—recent inflation in shipbuilding and the potential need for additional increases in worker wages and benefits—could further increase estimated OPC procurement costs.

Annual Procurement Quantities

As discussed in the CRS report on the National Security Cutter (NSC), OPC, and Fast Response Cutter (FRC) programs, the current OPC procurement profile, which reaches a maximum projected annual rate of two ships per year, would deliver OPCs many years after the end of the originally planned service lives of the Coast Guard’s existing medium-endurance cutters. GAO testified in July 2023 that under the OPC program’s current procurement schedule, the Coast Guard’s 14 Reliance-class 210-foot medium-endurance cutters would be replaced when they would be (if still in service) about 60 to 65 years old, and the Coast Guard’s 13 Famous-class 270-foot medium-endurance cutters would be replaced when they

²⁵ National Academies of Sciences, Engineering, and Medicine, Division on Earth and Life Studies and Transportation Research Board, *Acquisition and Operation of Polar Icebreakers: Fulfilling the Nation’s Needs, Letter Report*, with cover letter dated July 11, 2017, pp. 2, 4-6. See also Calvin Biesecker, “Coast Guard Leaving Options Open for Future Polar Icebreaker Fleet Type,” *Defense Daily*, April 12, 2018.

²⁶ Source: CQ transcript of hearing.

²⁷ Government Accountability Office, *Coast Guard Recapitalization[:] Actions Needed to Better Manage Acquisition Programs and Address Affordability Concerns*, Statement of Marie A. Mak, Director, Contracting and National Security Acquisitions, Testimony Before the Subcommittee on Coast Guard and Maritime Transportation, Committee on Transportation and Infrastructure, House of Representatives, July 27, 2023, GAO 23-106948, p. 9.

would be (if still in service) about 34 to 52 years old.²⁸ These ages, particularly for the Reliance-class cutters, would be high, raising questions concerning the ships' future operational availability and ability to perform missions cost effectively.

Coast Guard officials have testified that the service plans to extend the service lives of the medium-endurance cutters until they are replaced by OPCs. Operating aged medium-endurance cutters will incur maintenance and repair costs, particularly during the ships' final years of intended service. Even with investments in their capabilities, the ships may remain less capable in certain regards than OPCs.

One possible option for addressing this situation would be to increase the maximum annual OPC procurement rate from the currently planned two ships per year to three or four ships per year. Such an increase could result in the final (i.e., 25th) OPC being delivered a few to several years sooner than under the currently planned maximum rate. Increasing the maximum procurement rate for the OPC program could, depending on the exact approach taken, reduce OPC unit acquisition costs due to improved production economies of scale. Such an increase might also expand opportunities for using competition in the program. Notional alternative approaches for increasing the OPC procurement rate to three or four ships per year include:

- increasing the production rate to three or four ships per year at a single shipyard—an option that would depend on that shipyard's production capacity;
- using two shipyards for building OPCs to a single OPC design;
- using two shipyards for building OPCs to two designs, with each shipyard building OPCs to its own design—an option that would result in two OPC classes;²⁹ and
- building additional NSCs in the place of some of the planned OPCs—an option that might include de-scoping equipment on those NSCs where possible to reduce their acquisition cost and make their capabilities more similar to those of the OPC.

The fourth alternative above could be pursued in combination with one of the first three alternatives.

Block Buy Contracting

Using block buy contracting—a form of multiyear contracting used in a few Navy shipbuilding programs—could reduce procurement costs for PSCs, ASCs, or OPCs by perhaps 5% to 10%.³⁰ The Coast Guard typically uses contracts with options for its shipbuilding programs. Although a contract with options may resemble multiyear contracting, it operates more like a series of annual contracts. Contracts with options do not achieve the kinds of reductions in acquisition costs that are possible with multiyear contracting.

Section 311 of the Frank LoBiondo Coast Guard Authorization Act of 2018 (S. 140/P.L. 115-282 of December 4, 2018) provides permanent authority for the Coast Guard to use block buy contracting with economic order quantity (EOQ) purchases (i.e., up-front batch purchases) of components in its major acquisition programs. The authority is codified at 14 U.S.C. 1137.

²⁸ Government Accountability Office, *Coast Guard Recapitalization[:] Actions Needed to Better Manage Acquisition Programs and Address Affordability Concerns*, Statement of Marie A. Mak, Director, Contracting and National Security Acquisitions, Testimony Before the Subcommittee on Coast Guard and Maritime Transportation, Committee on Transportation and Infrastructure, House of Representatives, July 27, 2023, GAO 23-106948, Figure 4 on p. 14.

²⁹ Operating two OPC classes could be viewed as similar to how the Coast Guard currently operates two primary classes of medium-endurance cutters.

³⁰ For more on block buy contracting, see CRS Report R41909, *Multiyear Procurement (MYP) and Block Buy Contracting in Defense Acquisition: Background and Issues for Congress*, by Ronald O'Rourke.

Using multiyear contracting involves accepting certain tradeoffs, including the following:

- reduced congressional control over year-to-year spending;
- reduced flexibility changing 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 incurring penalty payments to shipbuilders if multiyear contracts are terminated due to unavailability of funds needed for the continuation of the contracts; and
- the risk that materials and components purchased for ships to be procured in future years might go to waste if those ships are not eventually procured.

The Navy since the 1990s has made extensive use of multiyear contracting in its ship and aircraft procurement programs. The Coast Guard, in contrast, has to date not used multiyear contracting in a major ship or aircraft procurement program. Given the relatively small size of the Coast Guard's Procurement, Construction, and Improvements (PC&I) account (see next section), the second tradeoff listed above may be of particular concern to the Coast Guard in deciding whether to use multiyear contracting.

Coast Guard Procurement, Construction, and Improvements (PC&I) Account

Three of the options presented in this testimony—building PSCs in parallel at two shipyards, accelerating the start of the timeline for designing and building ASCs, and increasing annual OPC procurement quantities—would require substantially increasing annual funding levels in the Coast Guard's Procurement, Construction, and Improvements (PC&I) account (or providing additional funding for Coast Guard ship procurement through the Navy's shipbuilding account, which has been done in the past).³¹ Increasing the PC&I funding level might also make the use of block buy contracting appear budgetarily less risky to Coast Guard officials.

Since FY2010, in nominal terms (not adjusted for inflation), funding for the Coast Guard's PC&I account has remained relatively flat while the Navy's shipbuilding account has more than doubled. The Navy's shipbuilding account increased from \$13.844 billion in FY2010 (enacted) to \$32.378 billion in FY2025 (requested), a nominal increase of about 134%. The Coast Guard's PC&I account, by comparison, was \$1.536 billion in FY2010 (enacted) and is \$1.564 billion in FY2025 (requested). After accounting for inflation, the requested FY2025 figure for the PC&I account amounts to about \$1,095 million (i.e., about \$1.1 billion) in FY2010 dollars, which is 29% less in real (inflation-adjusted) terms than the FY2010 enacted figure.³²

As noted in the CRS report on the NSC, OPC, and FRC programs, at a May 14, 2013, hearing on the Coast Guard's proposed FY2014 budget before the Homeland Security Subcommittee of the Senate Appropriations Committee, then-Coast Guard Commandant Admiral Robert Papp testified

³¹ Funding from the Navy's shipbuilding account funded about 89% of the procurement cost of *Healy*, as well as the procurement of 33 of the Coast Guard's 49 Island-class 110-foot patrol boats (the cutters being replaced by FRCs). Prior-year funding for the PSC program includes \$300 million in funding from the Navy's shipbuilding account (\$150 million each in FY2017 and FY2018).

³² FY2025 dollars were converted into FY2010 dollars using the DOD deflator for procurement excluding pay, fuel, and medical in Department of Defense, *National Defense Budget Estimates for FY 2025*, April 2024, p. 61 (Table 5-5).

that an annual PC&I funding level of about \$1 billion per year “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.”

Budget Displays

The budget displays for the PC&I account in the Coast Guard’s annual budget-justification book lack certain basic information about the Coast Guard’s shipbuilding programs, including estimated per-hull total procurement costs and scheduled delivery dates. These omissions can impede the ability of Members and their staff to identify and track year-to-year changes in per-hull procurement costs and delivery dates, which in turn can make it more difficult to conduct effective oversight of these programs. Congress may consider whether to direct the Coast Guard to include, in its annual budget justification book, budget displays for its shipbuilding (and aircraft) procurement programs that are modeled after those in the Navy’s annual budget-justification books, which include this kind of information.

Conclusion

Chairman Giménez, Ranking Member Thanedar, thank you again for the opportunity to appear before you today, and I will be pleased to respond to any questions the subcommittee may have.

Appendix. Biography

Mr. O'Rourke is a Phi Beta Kappa graduate of the Johns Hopkins University, from which he received his B.A. in international studies, and a valedictorian graduate of the University's Paul Nitze School of Advanced International Studies, where he received his M.A. in the same field.

Since 1984, Mr. O'Rourke has worked as a naval analyst for the Congressional Research Service of the Library of Congress. He has written many reports for Congress on various issues relating to the Navy, Coast Guard shipbuilding, China's naval forces, U.S.-China strategic competition in the South and East China seas, U.S. defense strategy, defense acquisition policy, the international security environment, and the Arctic. He regularly briefs Members of Congress and congressional staffers, and has testified before congressional committees on many occasions.

In 1996, he received a Distinguished Service Award from the Library of Congress for his service to Congress on naval issues.

In 2010, he was honored under the Great Federal Employees Initiative for his work on naval, strategic, and budgetary issues.

In 2012, he received the CRS Director's Award for his outstanding contributions in support of the Congress and the mission of CRS.

In 2017, he received the Superior Public Service Award from the Navy for service in a variety of roles at CRS while providing invaluable analysis of tremendous benefit to the Navy for a period spanning decades.

Mr. O'Rourke is the author of several journal articles on naval issues, and is a past winner of the U.S. Naval Institute's Arleigh Burke essay contest. He has given presentations on naval, Coast Guard, and strategy issues to a variety of U.S. and international audiences in government, industry, and academia.



Testimony
Before the Subcommittee on
Transportation and Maritime Security,
Committee on Homeland Security,
House of Representatives

For Release on Delivery
Expected at 10 a.m. ET
Tuesday, May 7, 2024

COAST GUARD ACQUISITIONS

Opportunities Exist to Improve Shipbuilding Outcomes

Statement of Shelby S. Oakley, Director, Contracting and
National Security Acquisitions

GAO Highlights

Highlights of [GAO-24-107488](#), a testimony before the Subcommittee on Transportation and Maritime Security, Committee on Homeland Security, House of Representatives

Why GAO Did This Study

The Coast Guard, a component of DHS, employs a variety of ships that conduct many missions, including drug interdiction, migrant interdiction, search and rescue, and ice operations. The Coast Guard plans to invest billions of dollars in two of its highest priority programs—acquiring three heavy icebreakers, known as Polar Security Cutters, and a fleet of 25 Offshore Patrol Cutters, to replace its older ships.

This statement addresses (1) how the Coast Guard acquires and oversees its shipbuilding programs, including its highest priority ones, (2) the primary challenges the Coast Guard has faced in acquiring and overseeing its highest priority shipbuilding programs and the resulting outcomes, and (3) recent GAO work on leading practices for acquiring new ships. This statement is based on information from [GAO-24-106573](#), [GAO-23-105805](#), [GAO-23-105949](#), and [GAO-24-105503](#), among other work. Information about the scope and methodology of prior work on which this statement is based can be found in those products.

What GAO Recommends

Over the past decade, GAO has made 40 recommendations to DHS and the Coast Guard on how to better manage the Coast Guard's acquisition programs. GAO also made three recommendations that DHS update its acquisition policies to fully implement product development principles. DHS concurred with the recommendations. GAO will continue to monitor DHS's and the Coast Guard's progress in addressing these recommendations.

View [GAO-24-107488](#). For more information, contact Shelby S. Oakley at (202) 512-4841 or oakleys@gao.gov.

May 7, 2024

COAST GUARD ACQUISITIONS

Opportunities Exist to Improve Shipbuilding Outcomes

What GAO Found

The U.S. Coast Guard manages its major shipbuilding programs—generally those with cost estimates of \$1 billion or greater—using the Department of Homeland Security's (DHS) acquisition framework. GAO's prior work found that the Coast Guard continues to face challenges in its highest priority shipbuilding acquisition programs—the Offshore Patrol Cutter and the Polar Security Cutter.

Design instability. The shipbuilders have yet to stabilize their designs, which has contributed to schedule delays and cost growth for both programs. For example, the Offshore Patrol Cutter program began ship construction without a matured critical technology, which led to redesign of portions of the ship and contributed to delays of the lead ship by almost 4 years. GAO recommended in June 2023 that the program mature this same critical technology before moving forward through design on the next set of ships. DHS did not concur. GAO closed this recommendation in April 2024 after the Coast Guard approved a design review without maturing the critical technology. However, GAO stands by the intent of the recommendation to minimize risk to the program.

Program oversight. Both programs lack key milestones in their acquisition program baselines—a document that sets the program's cost, schedule, and performance goals—to ensure adequate program oversight and accountability. For example, the Coast Guard did not include the delivery date of the last Polar Security Cutter in its acquisition program baseline. If included as a key event, failure to meet this date would trigger a formal assessment by DHS. In July 2023, GAO recommended that DHS and the Coast Guard include this delivery date in the acquisition program baseline, and the department concurred. Coast Guard officials told GAO they plan to include ship delivery dates in its revised baseline.

The Coast Guard's Offshore Patrol Cutter and Polar Security Cutter



Source: Eastern Shipbuilding Group (left image); Bollinger Mississippi Shipbuilding (right image). | [GAO-24-107488](#)

In May 2024, GAO identified leading practices in ship design, such as using iterative design to accelerate design maturity and employing robust in-house ship design capabilities and tools. These practices build on previous leading practices that GAO identified in product development and shipbuilding. Over the past decade, GAO has recommended numerous actions to the Coast Guard and DHS reflecting those practices—such as attaining design stability and developing solid business cases—to achieve successful shipbuilding outcomes.

May 7, 2024

Chairman Gimenez, Ranking Member Thanedar, and Members of the Subcommittee:

Thank you for the opportunity to discuss the U.S. Coast Guard's shipbuilding programs and challenges. The Coast Guard, a component within the Department of Homeland Security (DHS), is the principal federal agency responsible for maritime safety, security, and environmental stewardship in U.S. ports and waterways. The Coast Guard's fleet of ships, also known as cutters, enable the Coast Guard to perform a wide variety of critical missions, including drug interdiction, migrant interdiction, search and rescue, and ice operations.

As a part of its efforts to modernize its aging fleet of ships, the Coast Guard is acquiring several ships, including Offshore Patrol Cutters (OPC), Polar Security Cutters (PSC), National Security Cutters, and Fast Response Cutters. It plans to invest over \$28 billion to acquire these ships and over \$87 billion to operate and maintain them over their lifetimes. The Coast Guard intends for these new ships to augment its current fleet and provide additional capabilities beyond those offered by its older ships. However, its shipbuilding programs have faced significant schedule delays and cost increases that are contributing to capability and affordability gaps. Over the last decade, we have made 40 recommendations to DHS and the Coast Guard on how to better manage the Coast Guard's acquisition programs. Currently, we have 11 recommendations that remain open and that the Coast Guard has not fully addressed and seven others that have not been acted upon by the Coast Guard or overcome by events. The Coast Guard's persistent challenges in managing its programs within established cost and schedule goals highlight the need for the Coast Guard to reexamine how it manages shipbuilding programs.

My statement today will address (1) how the Coast Guard acquires and oversees its shipbuilding programs, including its highest priority ones; (2) the primary challenges the Coast Guard has faced in acquiring and overseeing these programs, and the resulting outcomes; and (3) our recently identified leading practices for acquiring new ships. This statement is based on our recent work examining the Coast Guard's OPC and PSC acquisitions, including our February 2024 report on DHS

acquisitions, our June 2023 report on the OPC, and our July 2023 report on the PSC, among others.¹

For the reports cited in this statement, among other methodologies, we analyzed Coast Guard guidance, data, and documentation; and interviewed Coast Guard officials to determine the extent to which Coast Guard acquisition programs are meeting their cost, schedule, and performance goals. Each report cited in this statement provides further detailed information on its objectives, scope, and methodology. For this cited work, we obtained some updated information from the Coast Guard on the design and delivery status of the OPC and PSC.

We conducted the work on which this statement is based in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

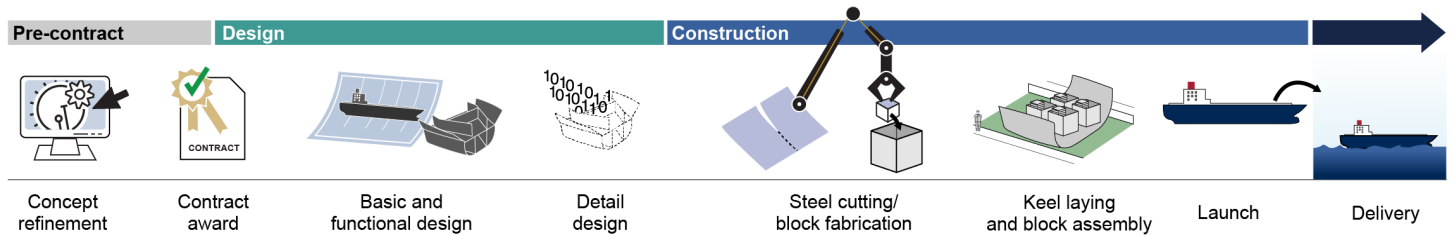
Background

Shipbuilding Is Complex and Centered on Key Design and Construction Events

Shipbuilding is a complex, multistage industrial activity that includes common key events regardless of the type of ship construction or nature of the buyer—Coast Guard, Navy, or commercial. As shown in figure 1, key events are sequenced among three primary stages that move from concept through design and construction to delivery of a new ship.

¹GAO, *DHS Annual Assessment: Most Programs Are Meeting Current Goals, but Some Continue to Face Cost and Schedule Challenges*, [GAO-24-106573](#) (Washington, D.C.: Feb. 22, 2024); *Coast Guard Acquisitions: Offshore Patrol Cutter Program Needs to Mature Technology and Design*, [GAO-23-105805](#) (Washington, D.C.: June 20, 2023); *Coast Guard Acquisitions: Polar Security Cutter Needs to Stabilize Design Before Starting Construction and Improve Schedule Oversight*, [GAO-23-105949](#) (Washington, D.C.: July 27, 2023); *Leading Practices: Agency Acquisition Policies Could Better Implement Key Product Development Principles*, [GAO-22-104513](#) (Washington, D.C.: Mar. 10, 2022); and *Navy Shipbuilding: Increased Use of Leading Design Practices Could Improve Timeliness of Deliveries*, [GAO-24-105503](#) (Washington, D.C.: May 2, 2024). While the Navy shipbuilding report does not cover the Coast Guard's efforts, the Navy and Coast Guard rely on many of the same shipbuilders, and the Coast Guard utilizes Navy acquisition and technical expertise for some of its programs, including the PSC.

Figure 1: Notional Ship Design and Construction Process



Source: GAO analysis of shipbuilding information; GAO (illustration). | GAO-24-107488

The design stage after contract award progresses from outlining the ship’s structure to routing systems that are distributed throughout the ship and then finalizing design details that facilitate construction.² Table 1 depicts key tasks generally common to all ship design phases.

Table 1: Ship Design Phases and Key Tasks

Design phase	Key tasks involved
Basic and functional design	<ul style="list-style-type: none"> Fix ship steel structure and set hydrodynamics Design safety systems and get approvals from applicable authorities Route all major distributive systems, including electricity, water, and other utilities Provide information on position of piping, ventilation, equipment, and other outfitting in each basic unit, or “block,” of ship construction Usually includes 3D modeling of the ship structure and major systems, with vendor-furnished information (VFI) incorporated to support understanding of final system design. VFI reflects the characteristics for ship equipment and components. This includes requirements for space, weight, power, water, and other utilities that feed ship systems
<i>Design stability achieved upon completion of basic and functional design</i>	
Detail design	<ul style="list-style-type: none"> Use 3D modeling information to generate work instructions for each block that show detailed system information and support construction, including guidance for subcontractors and suppliers, installation drawings, schedules, material lists, and lists of prefabricated materials and parts

Source: GAO analysis of commercial ship design information. | GAO-24-107488

²GAO-24-105503.

Once the ship design is sufficiently defined, builders move into the construction phase. This begins with the cutting and welding of large steel plates into the basic building units of ship construction, referred to as “blocks.” The blocks form completed or partial compartments, including engine rooms, storage areas, and accommodation spaces. Blocks are generally outfitted in the early stages of construction with pipes, brackets for machinery or cabling, ladders, and any other equipment that may be available for installation. This approach allows a block to be installed as a completed unit with connectors to adjacent blocks. Each block is ultimately welded together with other blocks to form larger sections that compose the ship’s structure. Once the shipbuilder has enough blocks and larger sections assembled, it lays the ship’s keel—or bottom of the ship—in preparation for ship erection.

After the keel is laid, other constructed sections are welded to the surrounding sections. During this stage, the shipbuilder also performs outfitting of machinery, engines, propeller shafts, and other large items requiring the use of overhead cranes. When the ship is watertight, the decision is made to float, or “launch,” the ship. The ship is then put into the water (or the drydock is flooded) and it is towed into a dock area for final outfitting and testing of machinery and equipment.

Shipbuilding Leading Practices Emphasize Importance of Design Stability

Since 2009, we have applied leading practices that we identified in commercial shipbuilding to our work evaluating Coast Guard and Navy shipbuilding programs. We have recommended numerous actions reflecting those practices intended to improve outcomes.³ The practices and our recommendations emphasized ensuring high levels of knowledge at key junctures throughout the acquisition process to achieve successful results. For example, shipbuilding leading practices we identified in 2009 found that design phases should include specific tasks that ensure increasing degrees of maturity as designs progress. This supports timely and predictable outcomes. These tasks culminate in design stability, which is achieved upon the completion of basic and functional designs, which are described above in table 1.⁴

³GAO, *Best Practices: High Levels of Knowledge at Key Points Differentiate Commercial Shipbuilding from Navy Shipbuilding*, [GAO-09-322](#), (Washington, D.C.: May 13, 2009); *Coast Guard Acquisitions: Polar Icebreaker Program Needs to Address Risks before Committing Resources*, [GAO-18-600](#) (Washington, D.C.: Sept. 4, 2018); and *Coast Guard Acquisitions: Opportunities Exist to Reduce Risk for the Offshore Patrol Cutter Program*, [GAO-21-9](#) (Washington, D.C.: Oct. 28, 2020).

⁴[GAO-09-322](#).

At this point of design stability, the shipbuilder has a clear understanding of the ship structure as well as how every system is set up and routed throughout the ship. Additionally, according to these shipbuilding leading practices, any critical technologies—hardware and software technologies critical to the fulfillment of the key objectives of an acquisition program—must be matured and proven before a design can be considered stable. If a program proceeds into construction with immature critical technologies or with an incomplete design, it increases the risk of completing out-of-sequence construction and rework, which can result in increased costs and schedule delays.

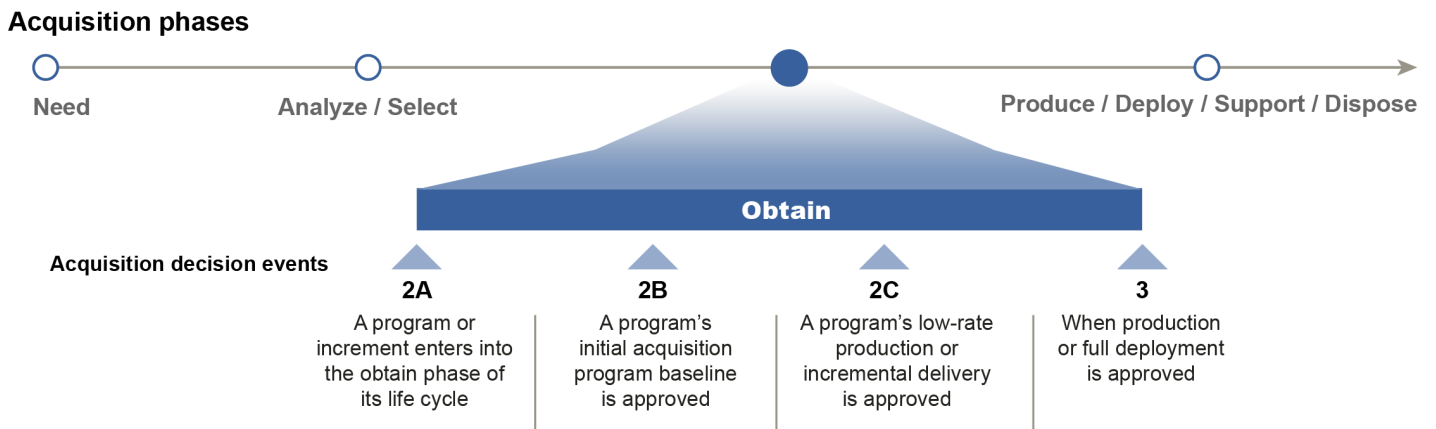
Coast Guard Manages and Oversees Its Highest Priority Shipbuilding Programs under a Tailored Acquisition Approach

Coast Guard Major Shipbuilding Programs Use a Tailored Approach under DHS's Acquisition Framework

As a component of DHS, the Coast Guard manages and oversees its major shipbuilding programs using DHS's acquisition framework, which is set forth in DHS acquisition policy.⁵ DHS's acquisition policy requires programs to manage their acquisition risks throughout the program's life cycle. As a program moves through its life cycle, it advances through a series of critical milestones called acquisition decision events (ADE), where DHS leadership assesses whether the program is ready to proceed to the next step (see fig. 2).

⁵See DHS Directive 102-01, *Acquisition Management Directive* (July 28, 2015) (incorporating change 1, Feb. 25, 2019); DHS Instruction 102-01-001, *Acquisition Management* (Jan. 10, 2023).

Figure 2: DHS Acquisition Decision Events in the Obtain Phase for Major Acquisition Programs



Source: GAO analysis of Department of Homeland Security (DHS) information. | GAO-24-107488

Note: DHS acquisition decision events (ADE) in the obtain phase include ADE 2A—when a program or increment enters into the obtain phase of its life cycle; ADE 2B—when a program's initial acquisition program baseline, which establishes the program's cost, schedule, and performance goals, is approved; ADE 2C—when low-rate production, or incremental delivery is approved; and ADE 3—when full-rate production or deployment is approved.

The DHS Under Secretary for Management serves as the decision authority for the department's largest acquisition programs—level 1 programs with life-cycle cost estimates of \$1 billion or greater. This includes the Coast Guard's major shipbuilding programs. The Vice Commandant of the Coast Guard serves as the component acquisition executive, the senior acquisition official within the Coast Guard.

In addition, the acquisition program baseline—required by DHS acquisition policy—is a key document used by the acquisition decision authority and other stakeholders to hold programs accountable. This document is the fundamental agreement between the program, the component, and department-level officials on what will be delivered, how it will perform, when it will be delivered, and what it will cost. Specifically, the acquisition program baseline establishes objective (target) and threshold (maximum acceptable costs, latest acceptable milestones, and minimum or maximum acceptable performance) parameters for a program. According to DHS policy, a program that has not met or will not meet any of its cost, schedule, or performance thresholds approved in the

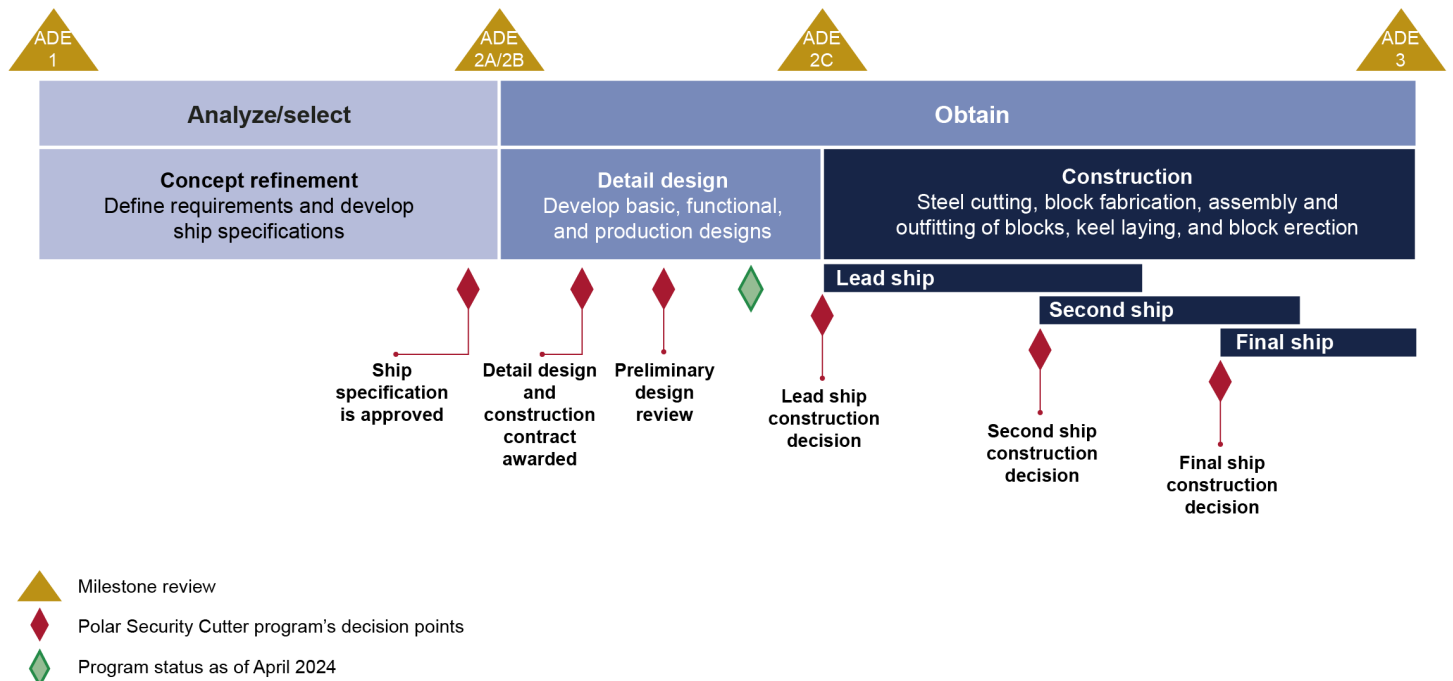
acquisition program baseline will be considered to be in breach status.⁶ Programs in breach status are required to develop a remediation plan that outlines a time frame for the program to either return to its parameters, rebaseline (i.e., establish new cost, schedule, or performance parameters), or have a DHS-led program review that results in recommendations for a revised baseline.

The DHS acquisition framework can be tailored if necessary. As approved by the Deputy Under Secretary for Management, certain Coast Guard shipbuilding programs use a tailored approach under the DHS acquisition framework. Under this approach, for shipbuilding programs where ADE 2C—when DHS approves a program to begin low-rate production—occurs within a year of ADE 2B, ADE 2C will be held prior to commencing construction of the lead ship.⁷ Within the acquisition framework, our 2009 shipbuilding leading practices call for design stability at ADE 2C for shipbuilding programs. Figure 3 shows how the Coast Guard applies the acquisition framework to the PSC within the shipbuilding phases.

⁶If it is determined that an acquisition program cannot meet an approved cost, schedule, or performance parameter due to a necessary change in program scope resulting from circumstances beyond the program's control—such as a natural event or changes in funding, among others—the acquisition decision authority may approve an administrative update.

⁷For Coast Guard acquisition policies and procedures that provide updated guidance for the implementation of the Department of Homeland Security (DHS) acquisition management and review process, see Coast Guard Commandant Instruction 5000.10H, *Major Systems Acquisition Management (MSAM)* (Aug. 2023).

Figure 3: Acquisition Framework for Polar Security Cutter Program



Source: GAO analysis of Department of Homeland Security, Coast Guard, and Navy information. | GAO-24-107488

Several organizations participate in the oversight and execution of the Coast Guard’s shipbuilding programs, including:

- **Program office.** An office led by a program manager who executes the program in accordance with its cost, schedule, and performance baselines.
- **Project resident office.** An office set up by the program that provides on-site supervision of ship construction.
- **Defense Contract Management Agency.** An agency in the Department of Defense that assists the Coast Guard by assessing shipbuilder earned value management systems—a tool to measure value of work completed against work expected—to ensure the shipbuilder’s data are valid.

PSC and OPC Are Two of the Coast Guard's Highest Priority Shipbuilding Programs

The Coast Guard's newest ships are intended to deliver greater capability than the older ships they will replace. Some examples of capabilities include the ship's range and the time a ship can spend at sea. Figure 4 depicts the OPC and PSC, which are Coast Guard's highest priority shipbuilding programs.

Figure 4: Coast Guard's Offshore Patrol Cutter and Polar Security Cutter



Source: Eastern Shipbuilding Group (left image); Bollinger Mississippi Shipbuilding (right image). | GAO-24-107488

- **OPC.** As of 2023, the Coast Guard planned to invest about \$14 billion to acquire 25 OPCs and about \$50 billion to maintain them. The OPCs will conduct multi-mission operations including homeland security, law enforcement, and search and rescue. They are intended to replace the Coast Guard's aging Medium Endurance Cutters. The OPC is designed for longer-distance transit, extended on-scene presence, and operations with deployable aircraft and small boats. In September 2016, the Coast Guard selected Eastern Shipbuilding Group (ESG) as OPC's shipbuilder and authorized the shipbuilder to proceed with detail design.⁸ The Coast Guard subsequently authorized construction of the lead ship in September 2018. After a 2018 hurricane devastated the shipbuilder's facilities, the Coast Guard

⁸The Coast Guard selected ESG among three vendors previously awarded contracts for preliminary design work for the OPC. The Coast Guard selected ESG to proceed with its work by exercising ESG's contract option for detail design in September 2016, and an option for construction of the lead ship in September 2018.

split the program into two stages, with stage 1 covering OPCs 1-4 and stage 2 covering OPCs 5-15. Since then, the Coast Guard has proceeded with construction on OPCs 2-4. In June 2022, the Coast Guard awarded a contract for detail design and construction of stage 2 ships to Austal USA, LLC, and according to officials, the program plans to start construction of OPC 5 by September 2024. The Coast Guard plans to acquire OPCs 16-25 in a future effort.

- **PSC.** As of 2023, the Coast Guard planned to invest about \$3 billion to acquire three PSCs and \$9 billion to maintain them. The PSCs will replace the Coast Guard's only operational heavy polar icebreaker. These ships will be the first heavy polar icebreakers that any U.S. government agency has bought in almost 50 years. The Coast Guard is responsible for meeting the nation's icebreaking needs in the Arctic and Antarctic. However, the Coast Guard has assessed that it currently does not have the capacity or capability to assure presence and reliable access to the Arctic. In 2019, the program awarded VT Halter Marine, Inc. a contract for detail design and construction of up to three ships. In November 2022, Bollinger Shipyards of Louisiana bought VT Halter, which was renamed Bollinger Mississippi Shipbuilding. As of October 2023, after government approval, Bollinger began production on a limited number of prototype units to help mitigate PSC production risks.
- **Other shipbuilding programs.** The Coast Guard also has several other current and upcoming major shipbuilding programs, such as the Waterways Commerce Cutter, the Great Lakes icebreaker, and the potential Arctic icebreakers. The Coast Guard plans to replace its legacy fleet of construction and river/inland buoy tenders—which maintain and replace navigational buoys—with 30 Waterway Commerce Cutters. There will be three variants of these cutters. The Coast Guard awarded a design and engineering contract to Birdon America, Inc. for the first variant. The first variant includes 27 ships. Their mission is to establish, maintain, and operate aids to maritime navigation on the western rivers and inland waterways.

The Coast Guard also plans to procure a Great Lakes heavy icebreaker to augment its only heavy domestic icebreaker in the region. The Great Lakes heavy domestic icebreaker assists in keeping channels and harbors open to navigation in response to the reasonable demands of commerce to meet the winter shipping needs of industry. In addition, Congress directed the Coast Guard to assess its fleet mix to include medium icebreakers, and depending on the outcome of that assessment, stand up a program office for the acquisition of medium polar icebreakers, specifically the Arctic

Security Cutter, no later than January 1, 2025.⁹ The Coast Guard also has two late-stage shipbuilding programs—the National Security Cutters and the Fast Response Cutters. As of April 2024, the shipbuilders had delivered 10 of 11 National Security Cutters and 56 of 65 Fast Response Cutters.

Design, Oversight, and Contractor Challenges Continue to Plague Coast Guard’s Highest Priority Shipbuilding Programs

The Coast Guard’s highest priority shipbuilding programs—OPC and PSC—are well behind schedule and have experienced significant cost growth. According to program officials, the OPC stage 1 shipbuilder is going through a review to assess risks of exceeding schedule targets. In addition, the PSC program has breached its cost and schedule baselines. Our prior work has found that these poor outcomes are driven by the Coast Guard’s challenges in three main areas: (1) design instability, (2) program baselines missing key events to enable oversight, and (3) poor contractor performance.

Design Instability Drove Schedule Delays and Cost Increases

Both the OPC and PSC have struggled with achieving a stable design to support construction, as called for by the shipbuilding leading practices we identified in 2009. Years after we first identified these deficiencies, the Coast Guard still has not gained the requisite knowledge for either program. These deficiencies have contributed to delays in delivery of the OPC and PSC lead ships by almost 4 and 5 years, respectively. Further, the OPC and PSC cost estimates have increased by nearly \$11 billion and more than \$2 billion past their original estimates, respectively.

OPC. Since 2020, we have found that DHS and the Coast Guard have allowed the OPC program to repeatedly move forward through key acquisition decisions, despite significant risks, including design instability. We previously found that, in general, concurrency or overlap between the technology development, design, and construction phases of shipbuilding results in poor acquisition outcomes, including cost growth and schedule delays that disrupt multiple ships in the class.¹⁰ Leading practices call for

⁹James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, Pub. L. No. 117-263, § 11218 (2022).

¹⁰GAO, *Navy Shipbuilding: Past Performance Provides Valuable Lessons for Future Investments*, [GAO-18-238SP](#) (Washington, D.C.: June 6, 2018).

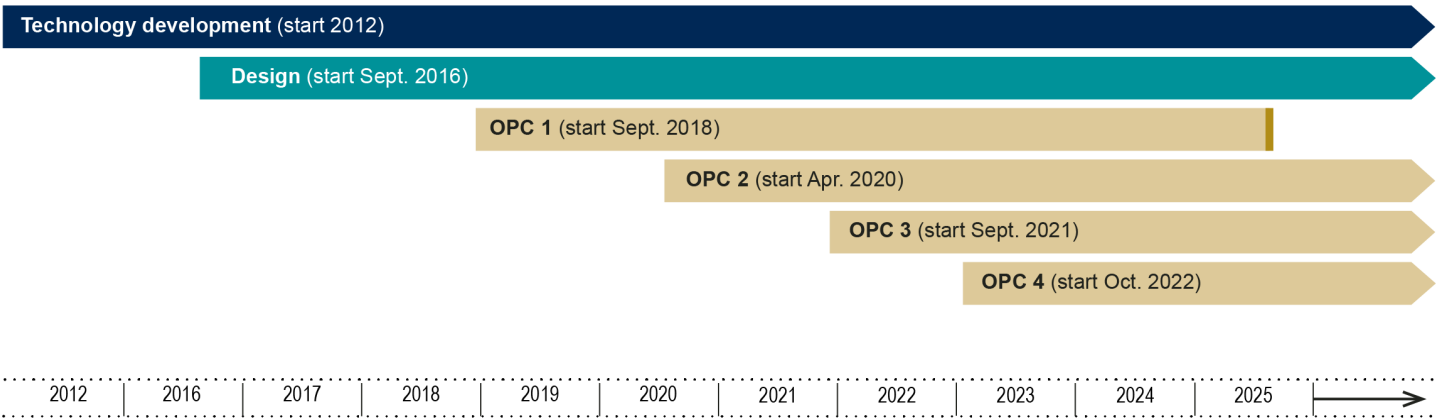
minimal concurrency. We found that OPC had significant concurrency between technology development, design, and construction (see fig 5).¹¹

Figure 5: Offshore Patrol Cutter (OPC) Program Continues Risky Approach of Overlapping Acquisition Phases

Leading practice: Minimal concurrency



OPC: Significant concurrency



Fiscal Year

estimated end date

Source: GAO analysis of U.S. Coast Guard documentation. | GAO-24-107488

Note: While some overlap between the design and construction phases is normal, the OPC program has significant overlap between all three phases. The OPC’s design phase in this figure refers to the detail design effort that began after the Coast Guard exercised Eastern Shipbuilding Group’s contract option for detail design in September 2016.

Further, contrary to our 2009 shipbuilding leading practices, DHS and the Coast Guard authorized the program to start construction on all four OPCs without:

1. **Maturing a critical technology.** The davit—a crane that lowers and raises a ship’s small boats—is the OPC’s sole critical technology and a key enabling technology for carrying out its missions. We

¹¹GAO-21-9; and GAO-23-105805.

recommended in October 2020 that the program mature this technology for stage 1 ships prior to moving further through construction, and in June 2023 that the program develop a plan to mature the technology.¹² DHS concurred with both of these recommendations. However, as of August 2023, the Coast Guard said that they were still tracking two remaining high-risk issues with the system—one of which may have implications for completing the design of a portion of the ship. Further, the Coast Guard awarded a detail design and construction contract for the stage 2 ships without adequately maturing the stage 2 davit. We also recommended in June 2023 that the program mature the davit for stage 2 ships prior to moving forward through design. DHS did not concur with this recommendation, and we subsequently closed this recommendation in April 2024 after the Coast Guard approved a design review without maturing the critical technology. However, we stand by the intent of the recommendation to minimize risk to the program. Without maturing critical technologies early in development, the likelihood that it will lead to design, manufacturing, and construction changes later on increases significantly. These changes often lead to delays and cost increases when the contractor has to address these issues late in the program.

2. **Completing functional design.** The Coast Guard authorized construction on the lead ship prior to the stage 1 shipbuilder completing the functional design. We recommended in October 2020 and June 2023 that the program complete functional design before proceeding with construction on stage 1 and stage 2, respectively.¹³ DHS concurred with our October 2020 recommendation, but did not concur with our June 2023 recommendation. As of April 2024, the stage 1 functional design was 93 percent complete, and the Coast Guard has already proceeded with construction on all four ships. As of February 2024, the stage 2 functional design was 70 percent complete, and the program plans to start construction on OPC 5 by September 2024. We will continue to monitor the program's stage 2 design stability leading up to construction.

We also made recommendations in October 2020 and June 2023 to improve the Coast Guard's policy on technology maturity and design stability.¹⁴ The Coast Guard updated some guidance in response to our

¹²GAO-21-9; and [GAO-23-105805](#).

¹³GAO-21-9; and [GAO-23-105805](#).

¹⁴GAO-21-9; and [GAO-23-105805](#).

recommendations. For example, it updated guidance to emphasize the importance of its shipbuilding programs completing routing and design of major portions of distributive systems—systems that transport electricity, water, HVAC, and other utilities—prior to the start of lead ship construction. This is in line with our leading practices. However, the Coast Guard has yet to require programs to (1) demonstrate critical technologies in a realistic environment prior to contract award of detail design and construction, and (2) complete 100 percent of functional design prior to start of construction. Because the Coast Guard has made limited progress addressing our recommendations, we also made two matters for congressional consideration in 2023 that target the same issues. As of April 2024, Congress has yet to take action on these matters.

PSC. In July 2023, we found that the PSC’s design phase was already more than 2 years longer than originally planned and was not yet close to being complete.¹⁵ The PSC program originally planned to fully mature its design by March 2021. However, as of April 2024, Coast Guard officials said the program was targeting the end of 2024.

We found that four primary factors contributed to the shipbuilder’s almost 4-year delay in maturing the PSC’s design, according to program officials:

- U.S.-based designers and shipbuilders generally lacked experience designing and building heavy polar icebreakers.
- The ship design is complex, including that it used a specialized steel alloy that required technical study and development of new welding procedures before use.
- The shipbuilder overestimated the extent to which it could leverage the original design and had to make significant design changes to meet government specifications, according to program officials. The shipbuilder also made some design errors, such as selecting the wrong height for the lowest deck of the ship, which required significant, late redesign to correct.
- COVID-19 restrictions limited the extent to which the shipbuilder could collaborate and consult with its domestic and international partners.

We recommended in July 2023 that DHS ensure the lead PSC’s functional design is complete prior to approving construction, in line with our 2009 shipbuilding leading practices. DHS concurred with the

¹⁵[GAO-23-105949](#).

recommendation. In April 2024, Coast Guard officials said they expect the functional design to be 100 percent complete by the end of 2024 to support the start of construction at ADE 2C. Before the program can proceed through ADE 2C, the DHS Under Secretary for Management must approve this milestone.

Relatedly, in November 2023, the program declared a cost and schedule breach. The program determined it required additional funding in excess of its cost threshold based on updated cost data. The program also determined it would not complete its critical design review by December 2023 as planned. The program's breach remediation plan indicates that the program plans to submit its updated schedule and life-cycle cost estimate to DHS for approval by September 2024. The program also plans to submit its revised acquisition program baseline to DHS by the end of 2024. While the cost estimate is not complete, the remediation plan indicated that updated costs exceeded 20 percent of the previous baseline threshold of \$3.1 billion, or at least \$600 million.

Program Baselines Did Not Include Key Events to Enable Oversight

For both OPC and PSC, we found that the programs' acquisition program baselines did not include key events—namely, ship delivery dates—to help ensure oversight and hold the programs accountable for schedule delays. DHS acquisition policy states that acquisition program baselines should include dates for milestones such as acquisition decision events and additional key events necessary for the program. Further, when a program fails to achieve a milestone by the threshold date in the acquisition program baseline, DHS acquisition policy generally requires the program to notify its acquisition decision authority and component acquisition executive and develop a remediation plan.

In addition to requirements under the DHS acquisition policy, the Coast Guard's major acquisition programs have additional requirements to report breaches that meet a certain threshold. The Coast Guard must report these breaches to appropriate congressional committees in

accordance with Title 14 of the U.S. Code.¹⁶ As a result, if a Coast Guard major acquisition program is delayed and breaches its schedule, the program must notify the DHS Under Secretary for Management, Vice Commandant of the Coast Guard, and potentially congressional decision-makers, which helps to ensure oversight and hold the program accountable for schedule delays.

- **OPC.** In 2020, we found that the Coast Guard did not include OPC's delivery dates in the stage 1 acquisition program baseline. This resulted in over 5 years between milestone dates that DHS could have used to better monitor the program for schedule slips. The stage 2 preliminary acquisition program baseline similarly did not include the OPC delivery dates, which were notionally scheduled between fiscal years 2026 and 2037. Without including the delivery dates in the baselines, stage 2 would not have acquisition milestones for several years. We made two recommendations to DHS and the Coast Guard to include OPC's delivery dates in the acquisition program baselines for both stage 1 and stage 2. DHS concurred with both. As of April 2024, the Coast Guard had yet to update the baseline for stage 1 nor established the baseline for stage 2. According to program officials, they plan to add the delivery dates of selected ships for both stages 1 and 2 in the new baseline, which they expect to submit for review in June 2024.
- **PSC.** In July 2023, we found that, while the Coast Guard included the lead ship's delivery date in the acquisition program baseline, it did not include the delivery for PSC 3 (the last ship to be delivered). This effectively left a 4-year gap in the acquisition program baseline without a key event that would trigger a milestone review. That time frame covered a critical period of the program's progress, from acquisition decision event 3—which applies only to the lead ship—to the point at which all three PSCs are planned to be fully operational. We recommended that DHS and the Coast Guard include PSC 3's delivery date in the acquisition program baseline. DHS concurred with this recommendation. As of April 2024, the Coast Guard had yet to

¹⁶Title 14 of the U.S. Code requires the Coast Guard to report to the House Committee on Homeland Security, House Committee on Transportation and Infrastructure, and Senate Committee on Commerce, Science, and Transportation as soon as possible, but not later than 30 days, after the Coast Guard becomes aware of cost, schedule, or performance breaches that exceed certain thresholds set in the acquisition program baselines for level 1 or 2 programs. For cost and schedule breaches, the reporting requirement is triggered when the Coast Guard becomes aware of an acquisition program baseline breach that involves a likely cost overrun of greater than 15 percent or a likely delay of more than 180 days in the delivery schedule for any level 1 or 2 program. 14 U.S.C. § 1135. See also 14 U.S.C. § 1171.

implement the recommendation. The current rebaselining effort, expected to be complete by the end of 2024, presents the opportunity for the Coast Guard to take action on this recommendation.

**Shipbuilder Inexperience,
Unrealistic Schedules, and
Subcontractor
Underperformance
Hindered Progress**

We previously reported on the Coast Guard's challenges with underperforming contractors, including ESG and Bollinger, the respective shipbuilders for OPC stage 1 and PSC. Specifically, these challenges included shipbuilder inexperience, unrealistic schedules, and issues with subcontractor performance.

Shipbuilder inexperience. The OPC stage 1 shipbuilder did not have experience with federal contracts, and the PSC shipbuilder did not have prior experience designing and building heavy polar icebreakers. In addition, neither had the necessary business systems in place to monitor cost and schedule performance on their contracts.

- **OPC.** ESG did not have experience with federal contracts prior to the OPC contract. Coast Guard officials stated that this inexperience contributed to the challenges with ESG's schedule. In addition, ESG's business systems, such as its earned value management system used for tracking costs and schedule and its accounting system, were initially deficient.¹⁷ This hindered the Coast Guard's oversight of ESG and visibility into the OPC program's cost and schedule progress. Defense Contract Management Agency officials stated that the deficiencies were attributable, in part, to ESG's and the Coast Guard's inexperience with the earned value management system. This included ESG's lack of mature system processes and appropriate tools to support a major acquisition program of OPC's scope.
- **PSC.** According to Coast Guard officials and shipbuilder representatives, the U.S. industrial base lacks experience designing and building a heavy polar icebreaker, since the *Polar Star* and *Polar Sea* were designed and built over 45 years ago. Officials told us that, unlike with other shipbuilding programs, there were no existing U.S.-developed hull designs for a heavy polar icebreaker that the shipbuilder could easily leverage as a basis for PSC. To mitigate this inexperience, the shipbuilder initially planned to base the PSC design on a modified version of a polar icebreaking research ship, designed

¹⁷Earned value management is a project management tool that integrates the technical scope of work with schedule and cost elements and compares the value of work accomplished in a given period with the value of the work expected in that period. When used properly, earned value management can provide objective assessments of project progress, produce early warning signs of impending schedule delays and cost overruns, and provide unbiased estimates of anticipated costs at completion.

by a European company, which has yet to be constructed.¹⁸ However, the shipbuilder and its design subcontractor likely overestimated the extent to which that design could be leveraged, according to program officials.¹⁹ This resulted in the contractor having to make considerable changes to the design of that ship, which led to delays.

In July 2023, we found that the shipbuilder also did not have all six of the appropriate business systems, including an earned value management system, in place to manage the PSC program. The shipbuilder did not have experience with government contracts of this scope because it was building the first heavy icebreaker in decades and had not used these business systems prior to the PSC contract, according to program officials. This resulted in challenges with developing reliable cost and schedule estimates, among other things. Specifically, five of six business systems related to accounting, estimating, and other areas had yet to be determined as acceptable for different reasons. The PSC contract requires the shipbuilder to have acceptable business systems that meet specific criteria set forth in defense acquisition regulations.²⁰ The Coast Guard and shipbuilder are taking steps to address the data limitations and we will continue to monitor progress.

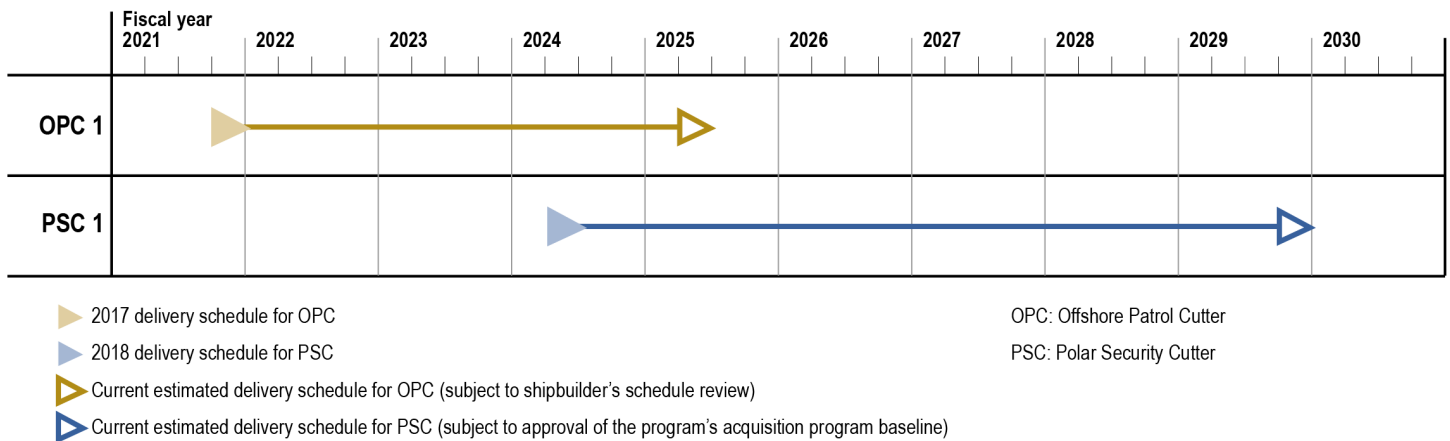
Unrealistic schedules. The Coast Guard adopted unrealistic schedules from the outset of both the OPC and PSC programs. Both programs are now experiencing schedule delays of about 4 years or more (see fig. 6). The programs' schedule challenges have been exacerbated by a lack of reliable schedule data from the shipbuilders that could be used to anchor projections of remaining work to complete the ships.

¹⁸The original PSC ship design was based on a German design for the Polarstern II.

¹⁹The program projects that construction of the lead ship will start before the end of 2024.

²⁰See Defense Federal Acquisition Regulation Supplement 252.242-7005.

Figure 6: Delivery Delays with the Lead Ship in the Offshore Patrol Cutter and Polar Security Cutter Programs, as of 2024



Source: GAO analysis of U.S. Coast Guard and Department of Homeland Security documentation. | GAO-24-107488

- OPC.** In October 2020, we found that prior to the construction award for OPC 1, the OPC contractor's schedule contained deficiencies that were contrary to leading practices we identified for developing schedules.²¹ Further, we found that the revised post-hurricane delivery dates for the first four OPCs were optimistic and did not fully incorporate schedule risks, increasing the likelihood that the OPCs will not be delivered when promised. In a review of the shipbuilder's schedule, the Defense Contract Management Agency and the Coast Guard found deficiencies, such as that the shipbuilder could not produce a valid critical path (the path of longest duration through the sequence of activities). We recommended that the Coast Guard fully address the deficiencies identified in the contractor's schedule. DHS concurred with this recommendation. As of April 2024, the recommendation remains open, and we will reassess the program's progress after its baseline is approved.

In June 2023, we found that the schedule remained optimistic given that the program was still having challenges manufacturing the shaft—the part of the propulsion system that transmits power from the engine to the propellers to generate thrust—and developing the davit.²² In April 2024, program officials told us that the OPC stage 1

²¹GAO-21-9.

²²GAO-23-105805.

shipbuilder is going through a review to assess risks of exceeding schedule targets, and that they estimate the lead ship will be delivered by June 2025. In total, the program is experiencing about a 4-year delay in delivery of the lead ship.

- **PSC.** In September 2018, we found that the PSC’s planned delivery dates were not informed by a realistic assessment of shipbuilding activities.²³ Instead, the schedule was driven by the potential gap in icebreaking capabilities once the Coast Guard’s only operating heavy polar icebreaker—the *Polar Star*—reaches the end of its service life. We recommended that the program develop a schedule in accordance with leading practices for project schedules to set realistic schedule goals for all three PSCs before the lead ship contract option was awarded. However, we closed the recommendation as not implemented because the program proceeded with the award in April 2019 without developing a realistic schedule. We will continue to monitor the shipbuilder’s progress in addressing these concerns. In July 2023, we found the program had yet to establish a realistic schedule.²⁴

As of April 2024, the program had not yet established an updated schedule. As noted earlier, the program breached its schedule and is in the process of updating its schedule estimates to develop a new acquisition program baseline. As part of its breach remediation plan submitted to DHS, the program developed a preliminary draft schedule baseline, which included a lead ship delivery date by the end of 2029—a delay of over 5 years from its original schedule baseline.²⁵

Poor subcontractor performance. The shipbuilders for the OPC and PSC programs used subcontractors to varying degrees to assist with developing the design, maturing critical technologies, and building key components. However, these subcontractors have not always met expectations and their performance has contributed to program delays.

- **OPC.** In October 2020, we found that ESG assumed responsibility for completing more of the detail design after ESG determined that the subcontractor responsible for this effort was underperforming.

²³[GAO-18-600](#).

²⁴[GAO-23-105949](#).

²⁵The program has not finalized its schedule baseline. It plans to submit its revised baseline to DHS by December 2024.

According to a Coast Guard engineering review, the additional burden on ESG's staff slowed the planned design development on the remainder of the ship.

In addition, ESG is working with a subcontractor to deliver a novel davit design. The new davit requires integration of existing technologies to meet a requirement to raise and lower a small boat in rough waves ranging from 8 to 13 feet. The Coast Guard proceeded with construction of OPCs 1 through 4 without demonstrating the maturity of the davit or resolving outstanding design issues. As of August 2023, according to Coast Guard officials, the subcontractor had not matured this system. The Coast Guard was also still tracking two remaining high-risk issues with the system: (1) all the equipment cannot fit in the electrical cabinet's designed space, which has led to a significant redesign, and (2) the davit cannot raise and lower small boats in rough conditions, as required. As of April 2024, the davit has not demonstrated maturity or been tested to meet the requirement.

Lastly, ESG has faced difficulties in getting compliant propulsion components from another subcontractor. Initial quality issues resulted in having to remanufacture some of the shaft segments, which according to program officials, has led to program delays.

- **PSC.** As noted above, according to program officials, the shipbuilder, then VT Halter, likely overestimated the extent to which it could leverage the original design and underestimated the magnitude of the design changes required to meet PSC requirements.²⁶ The design subcontractor also struggled with the complexity of the design work required for PSC, resulting in some fundamental errors that required significant, late design revisions to correct. Since Bollinger Shipyards bought VT Halter in November 2022, program officials said that the new shipbuilder embedded its own design experts with the design subcontractor to help work through issues and provide additional expertise.

²⁶[GAO-23-105949](#).

Leading Shipbuilding Practices Prioritize Timeliness, Iterative Designs, and User Involvement

Since our 2009 report on shipbuilding leading practices, we have identified new leading practices in product development and ship design that can inform the Coast Guard's current and future shipbuilding efforts. Current shipbuilding programs include OPC and PSC, and future programs include the Great Lakes icebreaker and the potential Arctic icebreakers. With the new leading practices, DHS, the Coast Guard, and Congress have an opportunity to rethink how ships are acquired, with the ultimate goal of achieving better cost and schedule outcomes.²⁷

In 2022, we identified leading practices for product development across different commercial industries, including shipbuilding. We found that successful companies deliver innovative products with predictable schedule and cost outcomes because their approaches are underpinned by four principles:

- attain a sound business case,
- use an iterative design approach,
- prioritize schedule by off-ramping capabilities, and
- use customer feedback to inform improvements.²⁸

In our 2022 report, we found that DHS's acquisition policies did not fully reflect these principles. In response to our recommendations, in January 2023, DHS revised its policies to better reflect the leading principles.²⁹ It is too early to tell whether DHS's acquisition programs, including the

²⁷We make recommendations to agencies and also matters for congressional consideration to address problems we have identified. For example, in June 2023, we made two matters for congressional consideration to require the Coast Guard to update its acquisition policy to reflect shipbuilding leading practices. We have found that action by Congress to address open matters can produce billions of dollars in financial savings, improve the effectiveness of federal agencies and programs, and help position the nation to address future challenges.

²⁸GAO, *Leading Practices: Agency Acquisition Policies Could Better Implement Key Product Development Principles*, [GAO-22-104513](#) (Washington, D.C.: Mar. 10, 2022). We further updated this leading practice work in our July 2023 report. See GAO, *Leading Practices: Iterative Cycles Enable Rapid Delivery of Complex, Innovative Products*, [GAO-23-106222](#) (Washington, D.C.: July 27, 2023).

²⁹We made three recommendations to DHS to update its acquisition policies to fully implement the following principles throughout development: (1) attaining a sound business case, (2) applying iterative design approaches, and (3) off-ramping capabilities when needed to maintain schedule. Based on DHS's January 2023 update to Instruction 102-01-001, *Acquisition Management*, we closed the first and third recommendations as implemented. As of April 2024, the second recommendation remains open as partially addressed.





Coast Guard's programs, have successfully implemented these principles. This is an area that we will continue to monitor.

Building off our 2022 report, we narrowed our focus and identified leading practices used by commercial ship buyers and builders to inform their understanding of design maturity and readiness for construction.³⁰ Last week, we published the results of our latest work, which builds on the principles we identified in 2022.³¹ We found that commercial ship buyers and builders use four primary leading practices, supported by 13 key elements, to enable shorter, predictable cycles for designing and delivering new ships, as discussed in figure 7.

³⁰The results from our work over the last 15 years demonstrate that leading practices from commercial industry can be applied thoughtfully to government shipbuilding acquisition to improve outcomes, even when cultural and structural differences yield different sets of incentives and priorities. As part of our 2009 and 2024 analyses on shipbuilding leading practices, we reported on the environments in which commercial and Navy shipbuilding operate. For additional detail on these differences, see [GAO-09-322](#) and [GAO-24-105503](#).

³¹We issued a new report on leading practices in 2023 that further refined the principles we identified in 2022. Our most recent work on shipbuilding leading practices, issued in May 2024, further validated these practices and their applicability to shipbuilding programs. See [GAO-23-106222](#).

Figure 7: Summary of Leading Practices GAO Found in Commercial Ship Design

Leading practice	Key elements
	<p>Establish business cases and requirements that support predictable design outcomes</p> <ul style="list-style-type: none"> • Prioritize timeliness of ship design and delivery • Avoid overly prescriptive requirements • Maintain a sound business case through continued reevaluation
	<p>Use iterative design to accelerate design maturity</p> <ul style="list-style-type: none"> • Prioritize user involvement in the ship design process • Leverage existing ship designs and systems in digital libraries • Prioritize timely vendor decisions and information • Make risk-based decisions to off-ramp design features • Minimize and isolate changes to existing designs • Carefully manage design innovation
	<p>Use efficient ship design collaboration and decision-making practices</p> <ul style="list-style-type: none"> • Use processes that support timely design decisions • Align decision-making with design maturity measures
	<p>Employ robust in-house ship design capabilities and tools</p> <ul style="list-style-type: none"> • Maintain strong in-house design workforce capabilities • Use ship design tools to shorten cycle time

Source: GAO analysis of commercial company information; GAO (illustrations). | GAO-24-107488

In our May 2024 report, we found that Navy shipbuilding programs often take significantly longer to design and deliver new ships compared with the typical timelines for commercial ships. We found several factors contributed to the differences in the pace of ship design and delivery, including:

- The Navy’s practices for setting requirements and designing new ships lack the streamlined and iterative practices that support shorter cycle times for commercial ships.

-
- The Navy's linear acquisition practices set key program requirements before designs are stable and lack the type of user involvement, timely vendor furnished information, and a robust design library used by commercial ship buyers and builders to support design maturation.
 - The Navy's layered review practices extend the time needed to make design decisions, and key program decisions lack the clear connection with design maturity measures that exists within the commercial ship industry.
 - The Navy's shortfalls in its in-house design capabilities and tools create challenges for achieving the shorter cycle times achieved for commercial ships.

We recommended that the Navy take several actions to improve design knowledge before beginning construction on new shipbuilding programs, among other things.³²

While we have not assessed the extent to which the Coast Guard is using ship design leading practices, it is clear that many of the design and schedule challenges that confront the Navy are evident, to varying degrees, in the OPC and PSC programs. DHS and the Coast Guard have an opportunity to incorporate leading practices into these shipbuilding programs and others that have not yet begun, such as the Great Lakes and Arctic icebreakers. Congress also has the opportunity through legislation and appropriations to further support the use of leading practices. For example, in 2023, we made two matters for congressional consideration to require the Coast Guard to update its acquisition policy to reflect shipbuilding leading practices. Our work has found that implementing these leading practices can lead to improved outcomes.

In conclusion, the outcomes that the Coast Guard is experiencing on its highest priority programs has fallen far short of expectations, and the cost overruns of these programs further raises concerns about the overall affordability of its efforts to modernize its fleet. Such outcomes are also threatening the Coast Guard's ability to meet its missions to protect our homeland. Over the past decade, we have provided numerous opportunities through our recommendations for the Coast Guard and DHS to change their acquisition approach and align with leading practices for acquisition. While they have taken some action, they continue to make decisions that imperil their highest priority programs. Moving forward,

³²The Navy agreed with seven of our eight recommendations and partially agreed with one. We stand by our recommendations and will follow up with the Navy on its efforts to address them. [GAO-24-105503](#).

addressing our many open recommendations and being mindful of our updated work on ship design leading practices would provide the Coast Guard with a more solid foundation to acquire the capabilities it needs to meet its important missions. We will continue to assess the Coast Guard's efforts in this area.

Chairman Gimenez, Ranking Member Thanedar, and Members of the Subcommittee, this completes my prepared statement. I would be pleased to respond to any questions that you may have at this time.

GAO Contact and Staff Acknowledgments

If you or your staff have any questions about this testimony, please contact Shelby S. Oakley, Director, Contracting and National Security Acquisitions, at (202) 512-4841 or oakleys@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement.

GAO staff who made key contributions to this testimony are Claire Li (Assistant Director), James Madar (Assistant Director), Ashley Rawson (Analyst-in-Charge), Patrick Breiding, Rose Brister, Scott Hepler, Tonya Humiston, Min-Hei (Michelle) Kim, Christian Perez, and Jacob Wu. Other staff who made key contributions to the reports cited in the testimony are identified in the source products.

This is a work of the U.S. government and is not subject to copyright protection in the United States. The published product may be reproduced and distributed in its entirety without further permission from GAO. However, because this work may contain copyrighted images or other material, permission from the copyright holder may be necessary if you wish to reproduce this material separately.

GAO's Mission

The Government Accountability Office, the audit, evaluation, and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.

Obtaining Copies of GAO Reports and Testimony

The fastest and easiest way to obtain copies of GAO documents at no cost is through our website. Each weekday afternoon, GAO posts on its [website](#) newly released reports, testimony, and correspondence. You can also [subscribe](#) to GAO's email updates to receive notification of newly posted products.

Order by Phone

The price of each GAO publication reflects GAO's actual cost of production and distribution and depends on the number of pages in the publication and whether the publication is printed in color or black and white. Pricing and ordering information is posted on GAO's website, <https://www.gao.gov/ordering.htm>.

Place orders by calling (202) 512-6000, toll free (866) 801-7077, or TDD (202) 512-2537.

Orders may be paid for using American Express, Discover Card, MasterCard, Visa, check, or money order. Call for additional information.

Connect with GAO

Connect with GAO on [Facebook](#), [Flickr](#), [Twitter](#), and [YouTube](#).
Subscribe to our [RSS Feeds](#) or [Email Updates](#). Listen to our [Podcasts](#).
Visit GAO on the web at <https://www.gao.gov>.

To Report Fraud, Waste, and Abuse in Federal Programs

Contact FraudNet:

Website: <https://www.gao.gov/about/what-gao-does/fraudnet>

Automated answering system: (800) 424-5454 or (202) 512-7700

Congressional Relations

A. Nicole Clowers, Managing Director, ClowersA@gao.gov, (202) 512-4400, U.S. Government Accountability Office, 441 G Street NW, Room 7125, Washington, DC 20548

Public Affairs

Chuck Young, Managing Director, youngc1@gao.gov, (202) 512-4800
U.S. Government Accountability Office, 441 G Street NW, Room 7149
Washington, DC 20548

Strategic Planning and External Liaison

Stephen J. Sanford, Managing Director, spel@gao.gov, (202) 512-4707
U.S. Government Accountability Office, 441 G Street NW, Room 7814,
Washington, DC 20548





**TESTIMONY OF
VICE ADMIRAL PAUL F. THOMAS
DEPUTY COMMANDANT FOR MISSION SUPPORT
ON**

**BUILDING THE FLEET:
ASSESSING THE DEPARTMENT OF HOMELAND SECURITY'S ROLE
IN THE UNITED STATES COAST GUARD'S ACQUISITIONS PROCESS**

**BEFORE THE
HOUSE HOMELAND SECURITY
SUBCOMMITTEE ON TRANSPORTATION AND MARITIME SECURITY**

MAY 7, 2024

INTRODUCTION

Good morning, Chairman Gimenez, Ranking Member Thanedar, and distinguished members of the Subcommittee. Thank you for your continued oversight and strong support of the U.S. Coast Guard. I am honored to appear before you today to update you on our ongoing efforts to recapitalize the Nation's legacy fleet of polar icebreakers. This work is a part of a larger, comprehensive effort to deliver mission capability across the Coast Guard's surface and aviation fleets; Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) systems; and shore infrastructure.

Our Commandant speaks regularly about the need to adapt to the ever-increasing pace of change. To keep up with the changing world around us, we must provide our total workforce with modern assets, systems, and infrastructure to support mission execution. In line with this direction, the Service continues to invest in a multibillion-dollar portfolio of acquisition programs established to identify and deliver the right capabilities for the Service. At the same time, the Coast Guard continues to prioritize investments in shore infrastructure, where every mission begins and ends: the facilities, piers, runways, and buildings that are as necessary for operations as our ships, boats, aircraft, and C5ISR systems.

Indeed, recapitalization remains a top priority for the Commandant and the Service, and today's efforts to invest in tomorrow's needs will shape the Coast Guard and impact national security for decades. This Subcommittee's continued support has helped us make tremendous progress, and it is critical that we continue to deliver assets to the field that improve mission execution and provide the capabilities the Nation needs. Simply put, we must act today to be prepared for tomorrow.

Significant investment is needed to advance our Nation's interests in the Arctic, and I embrace the trust Congress and the American people have placed in the Coast Guard. The Service will continue to prioritize actions that safeguard U.S. interests while promoting safe, secure, and environmentally responsible maritime activity in the Arctic.

ENDURING MISSION NEEDS IN THE POLAR REGIONS

As one of only eight Arctic Nations, the United States has both sovereign rights and responsibilities to safeguard our interests in the Arctic. Similarly, the United States has strong interests in the Antarctic region. The Coast Guard has been the lead federal agency in assuring surface access to the Polar Regions since 1965, meeting the Nation's most critical mission needs in the high latitudes.

In the Arctic, we are witnessing a dramatic transformation of the physical, operational, and geostrategic environment. Climate change is opening up new access to Arctic waters, and Arctic activity is increasing and evolving at a rapid pace, from a surge in oil and gas exploration a decade ago to growth in types and locations of vessel transits, including an expansion of environmental tourism. Dynamic and accelerated changes in the Arctic environment create new opportunities and challenges.

In addition to the challenges posed by increased access, the Arctic is a region of increasing strategic competition with the potential to elevate geopolitical tensions. In the U.S. Arctic, the Coast Guard is engaging more often with a growing number of strategic partners and competitors. Among the competitors, the Service is observing an increased presence by the People's Republic of China and the Russian Federation. Both nations have declared the Arctic a strategic priority; both have made significant investments in new or refurbished capabilities; and both are attempting to exert direct or indirect influence across the region using instruments of national power.

Likewise, the Coast Guard is a critical mission enabler in the Antarctic region, supporting scientific and U.S. objectives in the region by conducting the annual Operation *Deep Freeze*, which involves breaking a navigable channel through miles of ice up to 21 feet thick to allow fuel and supply ships to reach McMurdo Station, the U.S. Antarctic Program's logistics hub and largest station.

DELIVERING ENHANCED CAPABILITY

Coast Guard polar icebreakers are the foundation of U.S. operational presence and influence in the Polar Regions. These multi-mission cutters provide assured, year-round access not only for Coast Guard missions, but also in support of critical activities that protect key U.S. interests in the high latitudes.

With the strong support of this Subcommittee, we are moving forward with the acquisition of the Nation's first new heavy polar icebreakers in nearly five decades. The Polar Security Cutter (PSC) is one of the top acquisition priorities for the Coast Guard. When fully operational, PSCs will provide the global reach and icebreaking capability necessary to project U.S. presence and influence, conduct Coast Guard missions in the high latitudes, and advance our national interests in the Arctic and Antarctic regions.

The Coast Guard has established an Integrated Program Office (IPO) with the Navy to leverage each service's experience and expertise in large, complex vessel acquisition programs. The roles and responsibilities for each service are well-defined, and the acquisition is following established processes and procedures under the Department of Homeland Security's (DHS) acquisition framework.

The Coast Guard and Navy remain committed to attaining the necessary design maturity prior to beginning production activities. This approach ensures shipyard readiness and mitigates overall schedule risk. Detail design activities are ongoing, and long lead-time material for the lead ship has been delivered to the shipyard. The IPO has adopted an innovative and incremental approach to support early production, Prototype Fabrication Assessment (PFA), which is based on Navy best practices. By prioritizing and starting construction on up to eight low-risk modules, PFA allows the shipbuilder to progressively build workforce capability, test new processes and equipment, and reduce production risk. Four modules are currently under construction. These modules have achieved near 100 percent design maturity and present very low risk of re-work. These modules, unlike work done under special studies previously authorized, are part of the first PSC.

As the first heavy polar icebreaker to be constructed in the United States in nearly 50 years, we recognize the challenges associated with this effort, especially given the Defense Industrial Base's lack of recent experience and available infrastructure to design and build such a complex vessel. The Defense Industrial Base is a critical component of the United States' economic prosperity and national security, and the Coast Guard recognizes the strategic need to preserve national shipbuilding capacity. Bollinger Mississippi Shipyard is one of few U.S. shipyards with the capacity and capability to build and launch large government and commercial vessels, and we are committed to working together to produce the PSC.

Earlier this year, the Coast Guard notified Congress that the PSC program would exceed cost and schedule thresholds, in accordance with statutory and policy requirements. The program is in the process of reviewing cost and schedule projections provided by the PSC prime contractor to formally establish new cost and schedule parameters in the acquisition program baseline. This work is occurring in parallel with ongoing program activities to support delivery of the PSC fleet as quickly as possible.

PSCs will provide the global reach and icebreaking capability necessary to project U.S. influence, conduct Coast Guard missions in the high latitudes, and advance our national interests in the Arctic and Antarctic regions. Continued investment is key to meeting our Nation's growing needs in these rapidly evolving and dynamic areas of responsibility.

ADDRESSING NEEDS IN THE NEAR-TERM

To maintain heavy polar icebreaking capability until the PSC class is delivered, the Coast Guard established an effort to complete a service life extension on Coast Guard Cutter *Polar Star*, the Nation's only operational heavy polar icebreaker. The cutter recently began the fourth of five planned annual work periods to enable continued operation of the aging cutter and availability for the annual breakout of national facilities in Antarctica's McMurdo Sound and other missions in the high latitudes.

Likewise, the Service has initiated a service life extension program for Coast Guard Cutter *Healy*, the Service's only operational medium polar icebreaker, which was commissioned in 1999. The five-year phased production builds upon the lessons learned from *Polar Star*'s service life extension and is planned to be completed between 2026 and 2030. When complete, this effort will recapitalize a number of major systems while addressing significant operational degraders to maintain the Coast Guard's required heavy icebreaking capability.

In addition to the ongoing maintenance and service life-extending work in the Service's current fleet and with the Subcommittee's support, the Coast Guard received funding in the Fiscal Year 2024 Homeland Security appropriation to procure a commercially available polar icebreaker. The purchase of a commercially available polar icebreaker is an effective strategy to increase operational presence in the near-term and add long-term national capacity in the Arctic. Under the authority granted by the Don Young Coast Guard Authorization Act of Fiscal Year 2022, the Coast Guard intends to acquire a domestically produced commercially available polar icebreaker through a streamlined acquisition process that aligns with DHS and Coast Guard policy requirements. Initial activities will be directed at achieving initial operational capability, followed by a series of phased modifications to achieve full operational capability between annual Arctic operations.

CONCLUSION

The physical, operational, and geopolitical environment in the high latitudes continues to change rapidly, driving demand for Coast Guard presence, influence, and missions. The Coast Guard has served in these regions for more than 150 years and is central to a U.S. whole-of-government approach to ensuring national interests in the Polar Regions are protected. The continued support of the Administration and Congress for a modernized and capable polar fleet and increased Coast Guard capacity and capabilities in the high latitudes will fortify the Nation's position at this critical juncture.

Since 1790, the Coast Guard has safeguarded our Nation's maritime interests and natural resources on our rivers, in our ports, on the high seas, and around the world. Each day, the Coast Guard carries out its missions to protect lives, protect the environment, secure our maritime borders, and facilitate commerce. Our mission support and acquisition enterprises are, likewise, working each day to plan and deliver the assets and capabilities needed to support these critical missions.

The cutters, aircraft, boats, C5ISR systems, and shoreside infrastructure we acquire today will provide vital capability for decades to come. We are committed to maximizing the Nation's return on these important investments. Thank you for the opportunity to testify before you today and for all you do for the women and men of the Coast Guard. I look forward to answering your questions.