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THE FUTURE OF THE FLEETS: COAST GUARD AND NOAA SHIP RECAPITALIZATION

HEARING

BEFORE THE

SUBCOMMITTEE ON OCEANS, ATMOSPHERE, FISHERIES, AND COAST GUARD

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION
UNITED STATES SENATE

ONE HUNDRED FIFTEENTH CONGRESS

SECOND SESSION

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

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THE FUTURE OF THE FLEETS: COAST GUARD AND NOAA SHIP RECAPITALIZATION

THURSDAY, OCTOBER 11, 2018

U.S. SENATE,
SUBCOMMITTEE ON OCEANS, ATMOSPHERE, FISHERIES, AND THE COAST GUARD,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Subcommittee met, pursuant to notice, at 9:36 a.m. in room SR–253, Russell Senate Office Building, Hon. Dan Sullivan, Chairman of the Subcommittee, presiding.

Present: Senators Sullivan [presiding], Baldwin, Wicker, and Blumenthal.

OPENING STATEMENT OF HON. DAN SULLIVAN, U.S. SENATOR FROM ALASKA

Senator SULLIVAN. The Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard will now come to order.

The Subcommittee meeting today is to review the needs and current state of the fleet capitalization efforts of both the United States Coast Guard and the National Oceanic and Atmospheric Administration, NOAA.

The very missions of each agency contribute to the safety, national security, and economic growth of our nation.

Congress has given the Coast Guard an incredibly wide range of missions, from search and rescue, ice-breaking, marine environmental protection, to port security, drug interdiction, international crisis response, and readiness to support the Department of Defense operations, which the Coast Guard also does.

Increasing human activity in the Arctic, violence, terrorism, and drug trafficking in the Caribbean Basin, Central America, and Mexico, overseas contingency operations demand an increased Coast Guard presence at home and increasingly around the globe. These pressures are pushing the limits of the older generation cutters in the fleet.

Annually, NOAA, Office of Marine and Aviation Operations, manages to conduct more than a hundred missions, utilizing a small fleet of vessels to support the safety, security, and economic interests of our Nation.

The data and intelligence provided by NOAA safeguards the flow of cargo through our U.S. ports, monitors our fish stocks, and helps communities and fishermen plan around severe weather. However, half of the NOAA fleet that provides these services are due to retire in the not-too-distant future of 2028.

NOAA estimates that the loss of vessel capability without recapitalization would directly impact the nation's $4.6 trillion economic activity generated in U.S. seaports; which rely on accurate nautical charts, the $200 billion-a-year seafood industry of our nation, and nearly half of the nation's population that lives in coastal areas, the economic engine of which often relies on things like tourism, agriculture, and other important drivers of the U.S. economy.

My state, Alaska, has more than 44,000 miles of shoreline, which is more than the entire shoreline of the Lower 48 states. The missions of these agencies are not only vital in Alaska but throughout the country.

The area of responsibility assigned to the Coast Guard units within Alaskan waters is the largest in the nation and encompasses an area over three and a half million square miles.

While far from Alaska, I'd be remiss if I did not mention the courageous and important work conducted by the men and women in the Coast Guard and NOAA with responding to hurricanes this season. In fact, duty has called one of our witnesses today, Rear Admiral Silah, Director of NOAA's Office of Marine and Aviation Operations, who will not be participating today as he is responding to Hurricane Michael.

Each agency's recapitalization efforts is in a much different stage of the process. NOAA is in the opening stages of its efforts to produce eight new ships to replace half its fleet while the Coast Guard is 10 years into a much larger and very important recapitalization effort that has bipartisan support in the Congress.

I should also note that we are likely hopeful to take up the Coast Guard bill next week on the Senate Floor.

This Subcommittee is committed to working to ensure the success of the missions of these agencies and adequate resources are needed to ensure that this occurs.

Today, we will be hearing from the Coast Guard on the need for new ships, recapitalization strategies, and the status of current acquisition efforts. CRS and GAO experts can also provide additional viewpoints of best practices and acquisition strategies for both agencies.

With that, I want to thank our witnesses for being here. I apologize for us running a little bit late, and I now want to recognize the Ranking Member, Senator Baldwin, for any opening statements she may have.

Senator Baldwin.

STATEMENT OF HON. TAMMY BALDWIN,
U.S. SENATOR FROM WISCONSIN

Senator BALDWIN. Thank you, Mr. Chairman.

Well, first, I would like to join the Chairman in recognizing those still experiencing or just starting their recovery from Hurricane Michael and thank our responders for all of the hard and brave work that they're doing to assist those that are affected, and the efforts by the Coast Guard and NOAA in response to Hurricane Michael once again highlight how important these agencies are to ensuring the life and safety of U.S. citizens and the continuation of commerce in our waterways and ports. So we need to ensure that they have the right assets to do that.

That's why I'm pleased that we've convened this hearing today on the Coast Guard and NOAA's plans to recapitalize their critically important fleets.

The Coast Guard saves about 4,000 lives each year. It interdicts hundreds of millions of dollars worth of drugs before they reach the U.S. and it helps ensure our nation's security by patrolling our waters and high seas.

The Coast Guard also ensures the safety of mariners in the Great Lakes. During the winter months, it plays a critical role in ensuring commerce by conducting ice-breaking operations. The polar icebreakers, cutters, and patrol boats that make up the Coast Guard's fleet have all reached or will soon reach the end of their service lives.

NOAA has the largest Federal research fleet in the nation and its approximately 100 at-sea missions each year contribute significantly to the U.S. economy, both directly and indirectly.

The fleet collects data that's critical for making nautical charts to ensure safe and efficient commerce at our seaports and waterways. It's responsible for conducting fish stock assessments that support our nation's $200 billion fisheries.

The fleet collects data for storm surge modeling that aid in hurricane and other disaster responses, and it collects data that goes into producing NOAA's weather warnings and forecasts, but NOAA's ships are aging with ages ranging between five and 50 years old.

I'm proud to say that the newest ship in NOAA's fleet, the *Reuben Lasker,* named after a famed fisheries biologist, was built in Wisconsin by Fincantieri Marinette Marine. That shipyard, which also built the Coast Guard's Great Lakes Icebreaker, the *Mackinaw,* and builds the Littoral combat ship for the U.S. Navy, is one pillar of Wisconsin's proud shipbuilding industry.

Another is Fairbanks-Morse, which has supplied the U.S. Coast Guard and Navy with high-performance engines for over 70 years.

In short, Wisconsin knows how to build ships and knows how to manufacture the critical components that make those ships the best in the world, but more needs to be done to support our domestic shipbuilding industry and to ensure that when it comes to government procurement, U.S. taxpayer dollars are used to purchase U.S.-manufactured ships and shipboard components, and that's why I introduced a bill in April, the Made in America Shipbuilding Act, or MASA.

MASA would require Federal agencies to purchase vessels constructed only in the United States using U.S. raw materials and American-made onboard components, like valves, pumps, cranes, winches, and engines.

To protect against contract disruption or unintended consequences, there are waivers for legitimate reasons of cost, schedule, competition, and national security.

I'd like to hear from our witnesses, especially Admiral Haycock, about their views on Buy America requirements and the need to have strong domestic industrial-based partners to execute their missions.

Finally, I was really hoping we could get some of our Wisconsin shipbuilding companies here today for this hearing, but, Mr. Chair-

man, can we submit a few of their written statements for the record?

Senator SULLIVAN. Without objection.

Senator BALDWIN. All right. Thank you, Mr. Chairman.

[The information referred to follows:]

PREPARED STATEMENT OF DEEPAK NAVNITH, PRESIDENT, FAIRBANKS MORSE, LLC

Mr. Chairman, thank you for this opportunity to submit a statement on behalf of Fairbanks Morse, LLC regarding the important topic of recapitalizing the NOAA and Coast Guard fleets.

Fairbanks Morse has been a key supplier of propulsion engine systems to the U.S. Government since 1938, when Fairbanks Morse sold its first engine to the U.S. Navy. As the government ramped up the industrial base for World War II, the Navy invested $5 million ($100 million in today's dollars) in a new manufacturing site for diesel engines, enabling Fairbanks Morse to deliver 1,650 engines during the course of the War at the rate of one engine per day. For this effort, Fairbanks Morse was honored by the Department of War with two Army-Navy "E" awards—an extremely rare distinction honoring the company's excellence in supporting the war effort.

Fairbanks Morse is very proud of the fact that we currently have more than 500 US-made engines installed on current ships of the U.S. Government. We continue to manufacture, assemble and test these critical products for Navy and Coast Guard ships today, supplying hundreds of employees with well-paying jobs. Most recently, we were honored to have been chosen by Eastern Shipbuilding Corporation to supply main propulsion diesel engines for the Coast Guard's Offshore Patrol Cutter.

Fairbanks Morse is also currently producing engines for several Navy combatant, amphibious and auxiliary ships, as well as aircraft carriers. We additionally have a commercial contract to provide high-quality emergency power generators for the French nuclear power company, EDF. This level of manufacturing has allowed us to also make significant investments in our facilities, training programs for our highly skilled employees, and expanded field services programs for our customers.

Fairbanks Morse is currently the only U.S. manufacturer of large, medium-speed diesel engines. While we are confident that our people, products, and after-market services are state-of-the-art and second to none, I want to emphasize that a key contributor toward our ability to do so has been the U.S. government's policies requiring domestic manufacturing for critical ship components. These policies are clearly spelled out in the statutes establishing the National Defense Sealift Fund (NDSF) in Fiscal Year 1991 and clarified in subsequent National Defense Authorization Acts and annual Defense Appropriations Acts. Because of this requirement, Fairbanks Morse has been able to maintain its position as a critical U.S. supplier and sustainer of main propulsion engines for the Navy fleet—a particularly important U.S. defense capability for nuclear Navy NoForn programs.

There have been longstanding requirements that ships for the U.S. armed forces and for the coastwise commercial shipping trade must be built in the US. The reasons for this are very clear—we must ensure the ability of our defense industrial base to manufacture and support our armed forces, and we must ensure that our fleet of US-owned, US-built, and US-manned ships are available for supplying us in times of national emergencies.

However, there is currently no similar requirement that critical components on these ships must be manufactured in the U.S. When the funding for auxiliary and sealift ships was moved from the NDSF to the Navy's SCN (Shipbuilding and Conversion, Navy) account in FY 2015, the domestic manufacture requirements for critical components no longer applied. Additionally, there is no requirement for domestic manufacture of critical components for ships procured by the U.S. Coast Guard, NOAA, or any other government agency.

I also want to be clear on another critical point: Fairbanks Morse does not shy away from competition, nor do we simply rely on being given work by the government. We firmly believe that we have been competitive in every recent Coast Guard and Navy shipbuilding program. Where we have lost out, we are confident that it was either a minor difference on the initial acquisition cost, or that the propulsion system components were awarded based on a separate business relationship between the U.S. shipbuilder and the foreign supplier. Furthermore, we are confident that, had total life-cycle support for these engines been considered in the initial acquisition, our superior performance in training and after-market services would eclipse any difference in initial acquisition cost.

It is also important to understand that our ability to compete is often driven by differences in overall requirements under which our foreign competitors operate: important labor and environmental requirements; cost accounting and transparency; and especially the rigorous performance specifications demanded by our government customers that we are driven to meet on a daily basis. Most of our foreign competitors are global corporations that do not operate in such a specification-driven business environment, since the vast majority of their business is the world-wide commercial shipbuilding and power generation market.

Both the Navy and Coast Guard have experienced challenges in shipbuilding programs where foreign component suppliers were not prepared to meet the same qualifications that Fairbanks Morse considers an essential hallmark of its products. I will emphasize again that we do not shy away from such competition—we simply request that the playing field be level.

Given the Coast Guard's ongoing OPC program, the critical heavy icebreaker program, the anticipated modernization of the NOAA fleet, along with the Navy's planned ramp-up in ship and submarine construction, Fairbanks Morse firmly believes that foreign competitors for main propulsion engines and other critical shipbuilding components will see this as an opportunity to invest in U.S. manufacturing capability: *"If you require it, they will come."*

But they will only do so if it is clear that this is a requirement in order to compete. There are already several U.S. manufacturers capable of supplying smaller main propulsion engines. We would welcome US-based competition for manufacturing large, medium-speed diesel engines, but it is essential to put in place statutory requirements for domestic manufacture of critical components for ships procured by the U.S. government so that the competition is fair and that we can *count on a secure and stable manufacturing industrial base.*

That point was emphasized in the recently released report: "Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States", as directed by Presidential Executive Order #13806. The shipbuilding industrial base was identified as being one of the most fragile and threatened:

> *"Industries involved in the manufacturing of shipbuilding components were among the hardest hit by the global shift in the industrial base over the last 20 years. Of the top ten highest grossing industries in Navy shipbuilding, six are in the manufacturing sector. Since 2000, these industries experienced a combined decline of over 20,500 establishments in the U.S.*
>
> *"Contraction of the shipbuilding sector limits competition among U.S. suppliers of Navy components. In many cases, competition has altogether vanished, forcing the Navy to rely on single and sole source suppliers for critical components. These companies struggle to survive and lack the resources needed to invest in innovative technology. Expanding the number of companies involved in Navy shipbuilding is important to maintaining a healthy industrial base that can fulfill the 355-ship fleet and support the Navy's long-range shipbuilding plan."*

Among challenges highlighted across the entire defense industrial base were procurement complexity, lengthy acquisition timelines, unique accounting standards, and burdensome security clearance requirements. In addition, the report highlighted cybersecurity gaps across the supply chain, in part due to the reliance on foreign-supplied components and materials. While improvements can and should be made in each of these areas, all of these issues are ones that Fairbanks Morse and other trusted U.S. manufacturers are accustomed to. We firmly believe that domestic manufacture requirements for critical components is an essential part of securing our Nation.

In conclusion, I want to thank the Committee for having this hearing and for this opportunity to provide our thoughts based on 80 years of partnering with the shipbuilding industry and the U.S. government. We look forward to working with Congress to develop policies that will ensure our Nation's ability to meet any national security challenges we encounter. Thank you, Mr. Chairman.

PREPARED STATEMENT OF LAURA R. HAAS, CEO,
AMERICAN SHIPBUILDING SUPPLIERS ASSOCIATION

The American Shipbuilding Suppliers Association (ASSA) represents unique companies which manufacture military grade components and systems relied upon by the Department of Defense's blue and brown water, subsea, air, and aerospace fleets. Our members supply, among other things: navigation systems; engines; generators; reduction gears; air compressors; specialty solenoids; hardened manifolds;

valves; switchboards; power converters; circuit breakers and power cables. When United States Navy or Coast Guard encounter hostilities while defending American interests, whether by sea, undersea, air, or space, they do so on the strength and reliability of mission critical components designed, developed and produced in America by ASSA members.

The Department of Defense (DOD) has always relied on us because of our ongoing commitment to reinvest our own assets in the development of new facilities, technologies and systems, primarily for the benefit of the military. We employ the best professionals and skilled labor in the country and produce American products that continue to guarantee the continuity of the fleet and the availability of good, well-paying jobs. Of course, our interests are best served by receiving orders from the DOD sufficient in volume and with adequate frequency and lead-time to ensure our abilities to maintain continuity in our ongoing product lines.

The President and Congress are ever engaged in the effort to balance the costs of constructing and maintaining fleets while ensuring the quality and continuity requisite to maintaining American security. As a result, President Trump's Executive Order (EO) 13806 recently directed the office of the Secretary of Defense (SECDEF) to study the overall costs of long and short-term DOD procurement and maintenance, along with positing the economic dynamics affecting those costs, and suggesting solutions. The SECDEF issued the report, "Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States." The report provides a comprehensive overview of domestic and international economic and political forces that have resulted in the degradation of the U.S. heavy commercial manufacturing base, and corresponding escalation of the general costs of production. It suggests that the state of that base is untenable view of, for instance, the Navy and Coast Guard's current fleet expansion, which is heavily dependent on a healthy, competitive commercial market. The report provides a comprehensive set of recommendations across executive departments, including legislation further stabilizing the U.S. Navy's traditional and necessary, American production requirements.

As a general matter, the DOD commercial supplier market itself is divided in two unequal parts: first, and largest, are those facilities who produce both military and non-military products, such as shipyards. Second, there are those industries which produce highly specialized, military grade, mission critical component parts. ASSA represents companies that fall into the latter category.

The referenced report focuses on forces that are generally adverse to all DOD contractors: inconsistent funding, loss of manufacturing facilities, pernicious regulation and procurement issues, unfair competition and lack of labor force training. These are indeed issues that should be addressed in a macro analysis. However, ASSA's member companies provide specialized research, design, manufacturing and support services that simply can not be accurately measured by mere market dynamics.

Congress is now considering myriad proposals included in the report for the funding and stabilization of the market to facilitate fleet expansion. ASSA represents the American industrial base that supports the U.S. Navy and U.S. Coast Guard shipbuilding community, we strongly and heartily endorse the recommendations proposed in this report. In particular, ASSA urges:

- Expanded direct investment in the lower-tier of the industrial base through the DOD's Defense Product Act Title III, Manufacturing Technology and Industrial Base Analysis and Sustainment programs
- Modernize the organic industrial base to ensure its readiness to sustain fleets and meet contingency surge requirements
- Further enhance efforts exploring next generation technology for future threats

Further of interest to ASSA is Senator Baldwin's bill, "Made in America Shipbuilding Act of 2018" which is strongly supported by ASSA. The current Buy American rules are insufficient and Senator Baldwin's bill is needed. ASSA members provide services that simply can not be replaced in times of crisis. The end result of the economic failure of any American industry, whether DOD related or not, is damaging to the country's vital interests. However, the end result of failure by economic debasement of the DOD suppliers like ASSA members, even if by misplaced reliance on otherwise deferential market forces, could be fatal to the country itself, it is truly a matter of national security.

Senator SULLIVAN. Well, again, I want to thank the distinguished panel of witnesses today.

Today, we have Rear Admiral Michael Haycock, who is the Assistant Commandant of the U.S. Coast Guard for Acquisition; Ms. Marie Mak, who is the Director, Contracting and National Security Acquisitions from the GAO; and Mr. Ronald O'Rourke, who is a Specialist in Naval Affairs from the Congressional Research Service.

Each of you will have 5 minutes to deliver an oral statement and a longer written statement will be included for the record.

Admiral Haycock, we'll begin with you, sir.

STATEMENT OF REAR ADMIRAL MICHAEL J. HAYCOCK, ASSISTANT COMMANDANT FOR ACQUISITION AND CHIEF ACQUISITION OFFICER, U.S. COAST GUARD

Admiral HAYCOCK. Good morning, Chairman Sullivan, Ranking Member Baldwin, and Distinguished Members of the Subcommittee.

Thank you for the opportunity to testify today. I respectfully request that my written testimony be entered in the record.

Senator SULLIVAN. Without objection.

Admiral HAYCOCK. As you know, the Coast Guard is simultaneously a Federal law enforcement agency, a maritime first responder, a regulatory body, a member of the intelligence community, a critical part of border security, and a military police.

To maintain our commitment to executing these statutory missions, the Coast Guard has made recapitalizing the services of surface, aviation, and command and control capabilities a top priority. These investments not only enhance our ability to execute the mission demands of today but also ensure that we can meet the mission demands of tomorrow.

The steadfast support of Congress and of this subcommittee in particular has positioned the Coast Guard for success in remaining ready, relevant, and responsive to present and future needs of the United States and on behalf of the service, I thank you.

As the Coast Guard's chief acquisition officer, I'm excited to be here today and to testify on vessel acquisitions. One of the most critical assets of our nation's maritime security is the offshore patrol cutter, and I'm thrilled to indicate that last month, the Coast Guard exercised a contract option to begin the construction of the lead offshore patrol cutter and to order the long lead materials for the second.

This contract action maintains the schedule to deliver the first offshore patrol cutter in 2021 and commence the replacement of our medium endurance cutters, some of which are over 50 years old, which is twice their planned service life in some cases.

Until we deliver the offshore patrol cutters, the Coast Guard needs to keep our aging medium endurance cutter fleet in fighting shape. To do so, the Coast Guard is in the advance planning stage to extend their service lives until the offshore patrol cutters enter operational service.

On the same day that we did the contract and optioned the OPC, we also executed a contract to bid the long lead time materials for the 11th national security cutter and early this summer, we took delivery of our 30th fast response cutter and exercised an option

for production of six more fast response cutters, bringing our current number of fast response cutters under contract to 50.

As our recapitalized white hull fleet of national security cutters and fast response cutters and offshore patrol cutters continues to come online and take the watch, the Coast Guard is also making significant strides toward rebuilding or building our polar security cutter and recapitalizing our fleet of aged river, construction, and inland buoy tenders with the waterways commerce cutter.

The United States has not built a heavy polar icebreaker in 40 years and the need for that capability as a strategic national asset, both in today's maritime environment and in the future, is more critical today than ever.

To prudently accelerate our polar security cutter acquisition timeline, the Coast Guard and the Navy formed an integrated program office. This arrangement enables us to utilize Navy expertise and their support while leveraging best practice for both services to maintain an accelerated acquisition schedule. It's a partnership that's paying significant dividends for one of the Coast Guard's highest acquisition priorities.

After significant industry engagement, a request for proposals was issued in March, nearly a month ahead of schedule, and we're on track to award a detailed design and construction contract in Fiscal Year 2019.

We've already received technical proposals from industry and we're looking forward to receiving cost proposals later on this fall.

The Coast Guard is also accelerating efforts to acquire a waterways commerce cutter fleet, another critically needed asset. Our nation's maritime transportation system contributes $4.6 trillion annually to the United States gross domestic product and these cutters play an important role in sustaining the safety and security of this vital economic resource.

However, the average age of our river construction inland buoy tenders is over 53 years old and the readiness and maintainability is continually becoming more challenging.

The Coast Guard is working with the Navy to examine the past with the best potential to effectively refresh this important capability.

All this progress toward recapitalization would not be possible without the hard work of the men and women supporting these acquisitions. We've got a deep and talented pool of program management, contracting and support professionals that keep our 20 major and non-major acquisition programs on schedule and on budget while ensuring the Coast Guard operators have the tools and the capabilities that they need to maintain safety and security of our maritime environment.

Once again, thank you very much for the opportunity to testify today, and I look forward to your questions.

[The prepared statement of Admiral Haycock follows:]

PREPARED STATEMENT OF REAR ADMIRAL MICHAEL J. HAYCOCK,
ASSISTANT COMMANDANT FOR ACQUISITION AND CHIEF ACQUISITION OFFICER,
U.S. COAST GUARD

Good morning Chairman Sullivan, Ranking Member Baldwin, and distinguished members of the subcommittee. I appreciate the opportunity to testify today and thank you for your enduring support of the United States Coast Guard.

The Coast Guard offers unique and enduring value to the Nation. A branch of the Armed Forces at all times, our combination of broad authorities and complementary capabilities squarely align with the President's national security and economic prosperity priorities. The Coast Guard is also a Federal law enforcement agency, a regulatory body, a first responder, and a member of the U.S. Intelligence Community, which uniquely position the Service to help secure the maritime border, combat transnational criminal organizations (TCOs), facilitate and safeguard commerce on America's waterways, and protect our national interests in the Polar Regions.

Coast Guard assets and capabilities serve as a force multiplier for the Department of Defense (DoD) and deploy worldwide to execute statutory defense operations in support of national security priorities. On any given day, 11 cutters, two maritime patrol aircraft, five helicopters, two specialized boarding teams, and an entire Port Security Unit are supporting DoD Combatant Commanders, as well as U.S. Cyber Command, on all seven continents. A squadron of six Coast Guard patrol boats and crews continue to patrol the waters of the Northern Arabian Gulf in close cooperation with the U.S. Navy, promoting regional peace and stability. Likewise, as one of the principal Federal agencies performing detection and monitoring in the southern maritime transit zone, the Coast Guard provides more than 4,000 hours of maritime patrol aircraft support and 2,000 major cutter days to U.S. Southern Command each year.

The Coast Guard is also the Nation's "maritime first responder." Our bias for action and ability to rapidly surge resources in response to emerging threats, as most recently demonstrated during this year's devastating hurricane season, are hallmark traits of our Service. Since the landfall of Hurricane Florence, Coast Guard men and women in helicopters, boats, cutters, vehicles and on foot have rescued over 1,100 people. This follows on the heels of last year's historic hurricane season.

Coast Guard mission readiness requires an ability to execute our full suite of missions in the present while simultaneously making the investments necessary to meet mission demands in the future.

Prudence demands we continue investing in a modernized Coast Guard. Recapitalization remains a top priority for the Commandant, and your support has helped us make tremendous progress.

The Coast Guard is in the midst of recapitalizing the service's surface, aviation and command and control capabilities through more than 20 major and non-major acquisition programs. These efforts are supported by a framework of governance and policies developed by the Department of Homeland Security and the Coast Guard, are in line with best practices identified by our Federal partners, including the Department of Defense and the U.S. Navy, and are constantly evolving based upon lessons learned.

With the support of the Administration and Congress, we are making significant progress toward building new Polar Security Cutters. This past March, we released a request for proposal (RFP) as a full and open competition, setting the stage for award of a Detail Design and Construction (DD&C) contract in FY 2019 for the construction of up to three heavy Polar Security Cutters. We are as close as we have ever been to recapitalizing our Polar icebreaking fleet; continued investment now is vital to solidifying our standing as an Arctic nation and affirms the Coast Guard's role in providing assured access to the Polar Regions for decades to come.

Last month, the Coast Guard exercised a contract option to begin production of the lead Offshore Patrol Cutter (OPC) and order long lead time materials for the second OPC. This marked a critical milestone for the program and keeps us on schedule to deliver the first OPC in 2021. The OPC will provide the tools to effectively enforce Federal laws, secure our maritime borders, disrupt TCOs, and respond to 21st century threats. Continued progress on this acquisition is absolutely vital to recapitalizing our aging fleet of Medium Endurance Cutters (MECs), some of which have already been in service for over a half century.

We are in advanced planning to extend the service life of a portion of our MEC fleet as a bridging strategy until OPCs are delivered. In concert with the extended range and capability of the National Security Cutter (NSC) and the enhanced coastal patrol capability of the Fast Response Cutter (FRC), OPCs will be the backbone of the Coast Guard's strategy to project and maintain offshore presence.

The Service continues efforts to accelerate recapitalization of our fleet of 35 river, construction, and inland buoy tenders, with an average age of over 52 years. Replacing this aging fleet with Waterways Commerce Cutters (WCC), for a modest investment, is critical to sustaining the overall safety of our Nation's Marine Transportation System, which contributes $4.6 trillion annually to our Gross Domestic Product.

While the aforementioned programs are in the relatively early stages of the acquisition life cycle, the Coast Guard continues to acquire critical cutters and boats at full rate production levels. The service recently accepted delivery of the service's seventh NSC (U.S. Coast Guard Cutter KIMBALL) and issued a contract for long lead time materials for the eleventh NSC. The NSC is capable of operating independently in the most challenging environments including the vast expanses of the Eastern Pacific Ocean where NSCs have led the Coast Guard's efforts to interdict dangerous narcotics before they can make it to U.S. shores.

We continue to deliver the fleet of new FRCs on budget and on schedule. In August, the Coast Guard exercised the second option under the Phase II contract to begin production of six more FRCs. With this action, the Coast Guard has ordered 50 FRCs to date, including two FRCs to initiate the recapitalization of our six patrol boats supporting enduring U.S. Central Command missions in southwest Asia.

In concert with efforts to acquire new assets, we are focused on maintaining the existing fleet of cutters and aircraft through sustainment programs. The current work being conducted at the Coast Guard Yard in Curtis Bay, Maryland, includes a Service Life Extension Project (SLEP) to enhance mission readiness and extend the service life of icebreaking tugs by approximately 15 years. We are also continuing the Midlife Maintenance Availability (MMA) on sea-going buoy tenders to address obsolescence of critical ship components and engineering systems. The work on these two platforms is vital to sustaining current mission performance and essential to maritime commerce.

Recently, the Coast Guard Yard's experience and expertise was put to use to complete a dockside renovation of the NOAA ship Ferdinand R. Hassler on time and under budget. This work was the latest project conducted under a five-year memorandum of understanding between the Coast Guard and NOAA that was signed in 2014.

In addition to vessel acquisition and sustainment projects, work continues to sustain the mission performance of our rotary and fixed-wing aviation assets and to address the condition of our aging shore infrastructure. These efforts are key to the Coast Guard's continued readiness across all mission areas.

While readiness and modernization investments improve current mission performance, our Service's greatest strength is undoubtedly our people. We are incredibly proud of our 48,000 Active Duty and Reserve members, 8,500 civilians, and over 27,000 volunteer members of the Coast Guard Auxiliary. Coast Guard operations require a resilient, capable workforce that draws upon the broad range of skills, talents, and experiences found in the American population. Together with modern platforms, our proficient, diverse, and adaptable workforce maximizes the Coast Guard's capacity to respond effectively to an increasingly complex operating environment.

History has proven that a ready, relevant, and responsive Coast Guard is an indispensable instrument of national security. With the continued support of the Administration and Congress, we will preserve momentum for our existing acquisition programs and employ risk-based decisions to balance readiness, modernization, and force structure with the evolving demands of the 21st century. Thank you for the opportunity to testify before you today and for all that you do for the men and women of the Coast Guard. I look forward to your questions.

Senator SULLIVAN. Thank you, Admiral.

Ms. Mak.

STATEMENT OF MARIE A. MAK, DIRECTOR, CONTRACTING AND NATIONAL SECURITY ACQUISITIONS, GOVERNMENT ACCOUNTABILITY OFFICE

Ms. MAK. Good morning, Chairman Sullivan, Ranking Member Baldwin, and Members of the Subcommittee.

Thank you for inviting me here today to discuss the critical efforts underway to recapitalize the Coast Guard's and NOAA's aging legacy assets, vital for protecting national and economic security.

Although our shipbuilding work has focused on the Coast Guard and Navy, the key acquisition principles I'll discuss today apply to any agency's vessel recapitalization effort.

The two areas that I would like to highlight today are, first, the need to develop a business case for ship programs that strike an appropriate balance between requirements and resources, and, second, the importance of having a long-term strategic plan that lays out acquisition needs and tradeoffs.

Much of our prior shipbuilding work has found that ship programs routinely exceed cost and schedule targets and do not meet performance goals. This is because shipbuilding programs typically start with a weak business case and do not fully assess risk and have optimistic and at times unrealistic cost schedule and performance goals.

We have found that a sound business case requires balance between the concepts selected to satisfy the operator requirements and the resources, design and technology maturity, funding, and time needed to build a ship.

At the heart of a business case is a knowledge-based approach, obtaining critical levels of knowledge at key points in the shipbuilding process before significant investments are made.

For instance, in our review this summer, we noted that the Coast Guard has some weaknesses in its business case for its new icebreaker. Addressing these concerns is important to ensure continuity between the legacy asset, the *Polar Star,* and the new ones so that any capability gap is minimized.

Having visited the *Polar Star* this summer, I give much credit to the Coast Guard crew for doing everything possible to keep that cutter operational. However, given this effort and the already existing capability gaps, the Coast Guard must get the acquisition of this new icebreaker right.

Second, to fully ensure that a business case is strong, a multiyear strategic look at all anticipated acquisition needs and resources are important since building ships requires stable funding over a long period of time to be fully successful.

A multiyear strategic look documented in a long-term plan is critical for achieving a balanced mix of executable programs that meet cost, schedule, and performance expectations.

We have previously reviewed the long-term planning practices of successful businesses and found that they assess product investments collectively from an enterprise level rather than as an independent and unrelated initiative.

In doing so, these companies help ensure that individual product business cases are affordable, within projected budgets, and meet the enterprise strategic vision.

An example of this type of strategic plan in government shipbuilding is the 30-year Naval Vessel Construction Plan, also known as the Navy's Long-Range Shipbuilding Plan. It reflects the quantity and categories of assets that the Navy needs to buy as well as the Navy's budget needs to execute the plan.

While we have previously noted challenges associated with the Navy's plan, we have also observed that such a plan is beneficial in that it lays out the strategic approach for decisionmaking.

As the Coast Guard is pursuing multiple ship acquisitions, this type of long-term plan is particularly important to help ensure that the agency has the assets that it needs to deliver services when and where needed.

In summary, when it comes to key shipbuilding best practices, it is important that each ship program has a sound business case with realistic cost, schedule, and performance targets, and that the agency's programs collectively be planned and accomplished within available resources.

By not doing so, gaps may emerge that could result in agencies being ill-prepared to counter future threats and fall short in meeting critical missions.

Chairman Sullivan, Ranking Member Baldwin, Members of the Subcommittee, this completes my prepared statement.

I would be pleased to answer any questions you may have.

Thank you.

[The prepared statement of Ms. Mak follows:]

PREPARED STATEMENT OF MARIE A. MAK, DIRECTOR, CONTRACTING AND NATIONAL SECURITY ACQUISITIONS, UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE

GAO Highlights

Highlights of GAO-19-147T, a testimony before the Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard, Committee on Commerce, Science, and Transportation, U.S. Senate

Why GAO Did This Study

Both the Coast Guard—a component of the Department of Homeland Security (DHS)—and the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) are investing significant resources to recapitalize their aging fleets of ships. Ensuring that the Coast Guard and NOAA maintain their ships and address potential capability gaps is vital for protecting national security and scientific interests.

This statement summarizes lessons that GAO has identified from its prior reviews of Coast Guard and Navy acquisitions, which can be applied to the Coast Guard's and NOAA's shipbuilding efforts. Specifically, this testimony provides information on, among other things, (1) long-term strategic planning for acquisitions, (2) the need for a sound business case, and (3) the leveraging of the Navy's acquisition resources and shipbuilding expertise. In its prior work, GAO reviewed Coast Guard and Navy programs and interviewed officials. For this testimony, GAO obtained publicly available information on NOAA's ship acquisition efforts.

What GAO Recommends

GAO has previously recommended that the Coast Guard develop a 20-year fleet modernization plan, reflect acquisition trade-off decisions in its annual Capital Investment Plans, and address risks to establish a sound business case for its polar icebreakers acquisition. DHS concurred with these recommendations and is taking steps to implement them.

View GAO-19-147T. For more information, contact Marie A. Mak at (202) 512-4841 or makm@gao.gov.

October 2018

COAST GUARD ACQUISITIONS

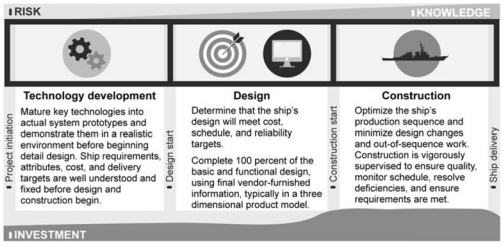
Lessons Learned to Inform Coast Guard and NOAA Shipbuilding Efforts

What GAO Found

GAO has found that acquisition programs can benefit from long-term strategic planning that identifies how tradeoff decisions would affect the future of the acquisition portfolio. In July 2018, GAO found the Coast Guard continues to manage its acquisitions through its annual budget process and the 5-year Capital Investment Plan. As a result of this planning process, the Coast Guard has continued to defer planned acquisitions to future years and left a number of operational capability gaps unaddressed. Incorporating the use of a long-term strategic plan and additional tradeoff discussion into the Capital Investment Plan could lead to more informed choices before irreversible commitments are made.

GAO's prior work has also found that acquisition programs should start with solid business cases before setting program baselines and committing resources. At the heart of a business case is a knowledge-based approach—successful shipbuilding programs build on attaining critical levels of knowledge at key points in the shipbuilding process before significant investments are made (see figure).

Executing a Strong Shipbuilding Case



Source: GAO depiction of notional shipbuilding process. | GAO-19-147T

In September 2018, GAO found the Coast Guard did not have this type of sound business case when it established the program baselines for its polar icebreaker program in March 2018 due to risks in technology, design, cost, and schedule. For example, the Coast Guard's planned delivery dates were not informed by a realistic assessment of shipbuilding activities, but rather were primarily driven by the potential gap in icebreaking capabilities once the Coast Guard's only operating heavy polar icebreaker reaches the end of its service life.

Agencies have partnered with the Navy to take advantage of its resources and shipbuilding expertise, including the Coast Guard when acquiring the polar icebreakers. For example, in September 2018, GAO found that the Coast Guard and the Navy had established an integrated program office and a ship design team. These teams provided input to Navy cost estimators, who developed the polar icebreaker program's cost estimate.

United States Government Accountability Office

Chairman Sullivan, Ranking Member Baldwin, and Members of the Subcommittee:

I am pleased to be here today to discuss key lessons and insights we have identified from our prior work in Coast Guard and Navy acquisitions that may be useful in informing the Coast Guard's and the National Oceanic and Atmospheric Administration's (NOAA) current efforts to recapitalize their aging fleets of ships. The Coast Guard's multi-billion dollar ship acquisition portfolio includes the National Security Cutters, Offshore Patrol Cutters, Fast Response Cutters, and heavy polar icebreakers, which collectively perform critical missions such as search and rescue, law enforcement, and icebreaking. NOAA's research and survey ships comprise the largest fleet of Federal research ships in the United States. Ensuring that the Coast

Guard and NOAA maintain their ship fleets and address potential capability gaps is vital for protecting national security and scientific interests.

My statement today provides information on: (1) long-term strategic planning for acquisitions (2) the need for a sound business case when acquiring new ships (3) leveraging of the Navy's acquisition expertise and resources and (4) considerations when selecting contracting mechanisms. This statement is based on our extensive body of work examining the Coast Guard's and Navy's acquisition efforts, including our September 2018 report on the Coast Guard's polar icebreaker acquisition and July 2018 report on Coast Guard recapitalization.[1] For the reports cited in this statement, among other methodologies, we analyzed Coast Guard and Navy guidance, data, and documentation, and interviewed Coast Guard and Navy officials. Detailed information on our scope and methodology can be found in the reports cited in this statement. In addition to our prior work, for this statement we obtained publicly available information from NOAA regarding its ship acquisition and recapitalization efforts; we did not assess its efforts.[2]

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 the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Long-Term Strategic Planning in Acquisitions Enables Better Tradeoff Decisions

Key elements of strategic planning include establishing long-term goals and strategies for how those goals are to be achieved.[3] Specifically for managing Coast Guard acquisitions, we have noted that a long-term plan that includes acquisition implications would enable tradeoffs to be addressed in advance, which leads to better informed choices and makes debate possible before irreversible commitments are made to individual programs.[4] Without this type of plan, decision makers do not have the information they need to better understand and address an agency's long-term outlook. Similarly, according to the Office of Management and Budget's capital planning guidance referenced by the Coast Guard's Major Systems Acquisition Manual, each agency is encouraged to have a plan that justifies its long-term capital asset decisions. This plan should include, among other things, (1) an analysis of the portfolio of assets already owned by the agency and in procurement, (2) the performance gap and capability necessary to bridge the old and new assets, and (3) justification for new acquisitions proposed for funding.

In June 2014, we found that the Coast Guard—a component within the Department of Homeland Security (DHS)—did not have a long-term fleet modernization plan that identified all acquisitions needed to meet mission needs over the next two decades within available resources.[5] Without such a plan, the Coast Guard repeatedly delayed and reduced its capabilities through its annual budget process and did not know the extent to which it could meet mission needs and achieve desired results. We recommended that the Coast Guard develop a 20-year fleet modernization plan that identifies all acquisitions needed to maintain the current level of service and the fiscal resources necessary to build the identified assets. DHS agreed with our recommendation but it has not yet approved a 20-year plan.

Further, in July 2018, we found the Coast Guard continues to manage its acquisitions through its annual budget process and the 5-year Capital Investment Plan,

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[1] GAO, *Coast Guard Acquisitions: Polar Icebreaker Program Needs to Address Risks before Committing Resources,* GAO–18–600 (Washington, D.C.: Sept. 4, 2018), *Coast Guard Acquisitions: Actions Needed to Address Longstanding Portfolio Management Challenges,* GAO–18–454 (Washington, D.C.: July 24, 2018); *Best Practices: High Levels of Knowledge at Key Points Differentiate Commercial Shipbuilding from Navy Shipbuilding,* GAO–09–322 (Washington, D.C.: May 13, 2009); and *Defense Acquisitions: Realistic Business Cases Needed to Execute Navy Shipbuilding Programs,* GAO–07–943T (Washington, D.C.: July 24, 2007).

[2] We have prior work on NOAA's efforts to collect hydrographic data, which includes information on hydrographic survey vessels. See GAO, *Hydrographic Surveying: NOAA Needs Better Cost Data and a Strategy for Expanding Private Sector Involvement in Data Collection,* GAO–17–510 (Washington, D.C.: June 15, 2017).

[3] See GAO, *Managing for Results: Critical Issues for Improving Federal Agencies' Strategic Plans,* GAO/GGD–97–180 (Washington, D.C.: Sept. 16, 1997).

[4] GAO, *Coast Guard Acquisitions: Limited Strategic Planning Efforts Pose Risk for Future Acquisitions,* GAO–17–747T (Washington, D.C.: July 25, 2017); and *Coast Guard Acquisitions: Better Information on Performance and Funding Needed to Address Shortfalls,* GAO–14–450 (Washington, D.C.: June 5, 2014).

[5] GAO–14–450.

which is congressionally mandated and submitted to Congress annually.[6] Coast Guard officials told us the Capital Investment Plan reflects the highest priorities of the department and that trade-off decisions are made as part of the annual budget process. However, the effects of these trade-off decisions, such as which acquisitions would take on more risk so others can be prioritized and adequately funded, are not communicated in the Capital Investment Plan to key decision makers. Over the years, this approach has left the Coast Guard with a bow wave of near-term unfunded acquisitions, negatively affecting recapitalization efforts, and limiting the effectiveness of long-term planning. As a result of this planning process, the Coast Guard has continued to defer planned acquisitions to future years and left a number of operational capability gaps unaddressed that could affect future operations. We recommended that the annual Capital Investment Plans reflect acquisition trade-off decisions and their effects. DHS concurred with this recommendation and plans to include additional information in future Capital Investment Plans to address how trade-off decisions could affect other major acquisition programs. According to Coast Guard officials, the Coast Guard plans to implement this recommendation by March 2020.

Examples of other fleet modernization plans include the Navy's annual naval vessel construction plan (also known as the Navy's long range shipbuilding plan), which reflects the quantity and categories of assets that the Navy needs to buy as well as the total number of assets in operation for each year. While we found in March 2006 that the Navy faced challenges associated with its long range shipbuilding plan, we also observed that such a plan is beneficial in that it lays out a strategic approach for decision making.[7] In October 2016, NOAA—which is within the Department of Commerce—approved a fleet plan that is intended to identify an integrated strategy for long-term recapitalization, including acquisition of up to eight new ships. In March 2017, NOAA indicated that long-term recapitalization of the NOAA fleet requires an annual, stable funding profile on the order of its Fiscal Year 2016 appropriations—about $80 million. NOAA noted that it will continue to proceed on schedule, as laid out in its fleet plan, or make adjustments based on available funding.

Successful Acquisition Programs Begin with Sound Business Cases

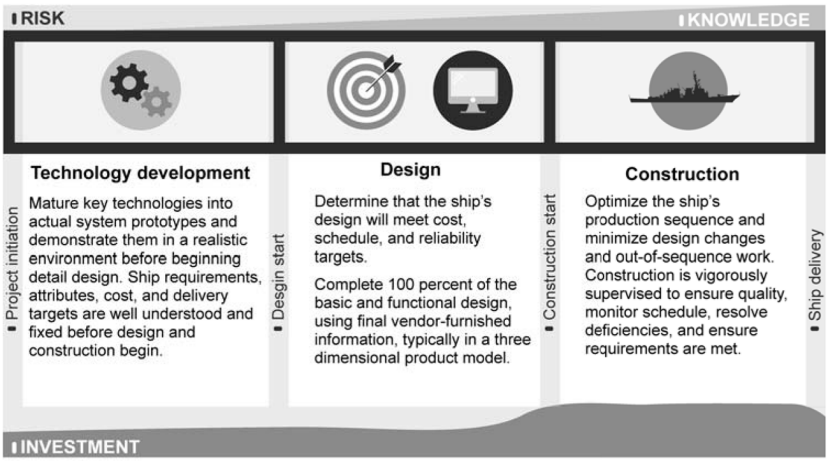
Our prior work has repeatedly found that successful acquisition programs start with solid, executable business cases before setting program baselines and committing resources.[8] A sound business case requires balance between the concept selected to satisfy operator requirements and the resources—design knowledge, technologies, funding, and time—needed to transform the concept into a product, such as a ship. At the heart of a business case is a knowledge-based approach—we have found that successful shipbuilding programs build on attaining critical levels of knowledge at key points in the shipbuilding process before significant investments are made (see figure 1).

[6] GAO–18–454.

[7] GAO, *Defense Acquisitions: Challenges Associated with the Navy's Long-Range Shipbuilding Plan,* GAO–06–587T (Washington, D.C.: Mar. 30, 2006).

[8] GAO, *Navy Shipbuilding: Past Performance Provides Valuable Lessons for Future Investments,* GAO–18–238SP (Washington, D.C.: June 6, 2018); *Weapon System Requirements: Detailed Systems Engineering Prior to Product Development Positions Programs for Success,* GAO–17–77 (Washington, D.C.: Nov. 17, 2016); GAO–09–322; and GAO–07–943T.

Figure 1: Executing a Strong Shipbuilding Case



Source: GAO depiction of notional shipbuilding process. / GAO–19–147T

We have previously found that key enablers of a good business case include firm, feasible requirements; plans for a stable design; mature technologies; reliable cost estimates; and realistic schedule targets.[9] Without a sound business case, acquisition programs are at risk of experiencing cost growth, schedule delays, and reduced capabilities.

In September 2018, we found the Coast Guard did not have this type of sound business case when it established the cost, schedule, and performance baselines for its polar icebreaker program in March 2018.[10] This was primarily due to risks in four key areas:

- *Technology.* The Coast Guard intends to use proven technologies for the program, but did not conduct a technology readiness assessment to determine the maturity of key technologies—which include the integrated power plant and azimuthing propulsors—prior to setting baselines.[11] As a result, the Coast Guard does not have full insight into whether these technologies, which we believe are critical technologies and merit such an assessment, are mature. Without a technology readiness assessment, the Coast Guard is potentially underrepresenting technical risk and increasing design risk.
- *Cost.* The cost estimate that informed the program's $9.8 billion cost baseline—which includes lifecycle costs for the acquisition, operations, and maintenance of three polar icebreakers—substantially met our best practices for being comprehensive, well-documented, and accurate, but only partially met best practices for being credible.[12] The cost estimate did not quantify the range of possible costs over the entire life of the program, such as the period of operations and

[9] GAO–17–77; GAO–07–943T; and *Best Practices: Using A Knowledge-Based Approach To Improve Weapon Acquisition,* GAO–04–386SP (Washington, D.C.: Jan. 1, 2004).

[10] GAO–18–600.

[11] A technology readiness assessment is a systematic, evidence-based process that evaluates the maturity of critical technologies—hardware and software technologies critical to the fulfillment of the key objectives of an acquisition program. According to our best practices, a technology readiness assessment should be conducted prior to program initiation. For more information, see *GAO Technology Readiness Assessment Guide: Best Practices for Evaluating the Readiness of Technology for Use in Acquisition Programs and Projects,* GAO–16–410G (Washington, D.C.: Aug. 11, 2016).

[12] The GAO Cost Estimating and Assessment Guide was used as criteria in this analysis. A cost estimate is considered reliable if the overall assessment ratings for each of the four characteristics—comprehensive, accurate, well documented, and credible—are substantially or fully met. For more information, see *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs,* GAO–09–3SP (Washington, D.C.: Mar. 2, 2009).

support. As a result, the cost estimate was not fully reliable and may underestimate the total funding needed for the program.

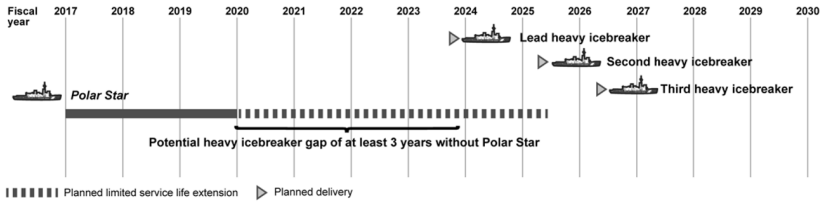
- *Schedule.* The Coast Guard's planned delivery dates of 2023, 2025, and 2026 for the three ships were not informed by a realistic assessment of shipbuilding activities, but rather were primarily driven by the potential gap in icebreaking capabilities once the Coast Guard's only operating heavy polar icebreaker—the *Polar Star*—reaches the end of its service life (see figure 2).

Figure 2: The Coast Guard's Heavy Polar Icebreaker, Polar Star

U.S. Coast Guard Cutter Polar Star
Source: U.S. Coast Guard. / GAO–19–147T

The *Polar Star's* service life is estimated to end between Fiscal Years 2020 and 2023. This creates a potential heavy polar icebreaker capability gap of about 3 years, if the *Polar Star's* service life were to end in 2020 and the lead polar icebreaker were to be delivered by the end of Fiscal Year 2023 as planned. If the lead ship is delivered later than planned in this scenario, the potential gap could be more than 3 years. The Coast Guard is planning to recapitalize the Polar Star's key systems starting in 2020 to extend the service life of the ship until the planned delivery of the second polar icebreaker (see figure 3).

Figure 3: The Coast Guard's Potential Heavy Polar Icebreaker Capability Gap and Planned Delivery of New Heavy Polar Icebreakers



Source: GAO analysis of U.S. Coast Guard documents. / GAO–19–147T

Further, our analysis of selected lead ships for other shipbuilding programs found the icebreaker program's estimated construction time of 3 years is optimistic. An unrealistic schedule puts the Coast Guard is at risk of not delivering the icebreakers when promised and the potential gap in icebreaking capabilities could widen.

- *Design.* The Coast Guard set program baselines before conducting a preliminary design review—a systems engineering event that is intended to verify that the contractor's design meets the requirement of the ship specifications and is producible—which puts the program at risk of having an unstable design, thereby increasing the program's cost and schedule risks. Although the Coast Guard set the program baselines prior to gaining knowledge on the feasibility of the selected shipbuilder's design, it has expressed a commitment to having a stable

design prior to the start of lead ship construction. This is consistent with shipbuilding best practices we identified in 2009.[13]

To address these four areas and other risks, we made six recommendations to DHS, Coast Guard, and the Navy in our September 2018 report.[14] DHS concurred with all six recommendations and identified actions it planned to take to address them.

In its October 2016 fleet plan, NOAA indicated the need to construct up to eight new ships by 2028 to maintain its capabilities for at-sea requirements. Ensuring a sound business case for each acquisition will be important as NOAA moves forward.

Leveraging Navy's Shipbuilding Experience May Create Efficiencies

Given the Navy's experience in shipbuilding, agencies have partnered with the Navy to take advantage of its expertise. For example, in April and September 2018, we found examples of how the Coast Guard had leveraged the Navy's resources and acquisition approaches when acquiring the polar icebreakers, including:[15]

- *Establishing an integrated program office and potentially using funding from both organizations.* In 2016, in response to a congressional report, the Navy and the Coast Guard established an integrated program office to acquire the icebreakers for Coast Guard operations. This relationship was officially memorialized through three memorandums in 2017.

  Given potential plans to fund the polar icebreaker program with both Navy and Coast Guard appropriations, the Navy and the Coast Guard had a memorandum of agreement with a budgeting and financial management appendix. In September 2018, however, we found that the Coast Guard and the Navy interpreted the meaning of "cost overruns" differently in the context of their agreement.[16] We also found that the agreement itself did not address how the Coast Guard and the Navy plan to handle any cost growth stemming from changes to the scope, terms, and conditions of the detail design and construction contract. We recommended that the Coast Guard, in collaboration with the Navy, revise the agreement to clarify and document how cost growth in the polar icebreaker program, including changes in scope, will be addressed between the two organizations. The Coast Guard concurred with this recommendation and plans to update the agreement by March 2019.
- *Establishing an integrated ship design team.* The ship design team includes Coast Guard and Navy technical experts who develop ship specifications based on the polar icebreaker program's operational requirements document. The ship design team is under the supervision of a Coast Guard ship design manager, who provides all technical oversight for development of the polar icebreaker's design.
- *Leveraging Navy cost estimating and contracting functions.* With input from the integrated program office and ship design team, Navy cost estimators developed the polar icebreaker program's cost estimate, which informed the program's cost baselines and affordability constraints. In addition, the Navy plans to award the polar icebreaker's detail design and construction contract under the Navy's contracting authority and use a tailored DHS acquisition process.
- *Supplementing the DHS acquisition process with the Navy's gate review process.* Coast Guard and Navy agreed to manage the polar icebreaker program using a tailored acquisition approach that supplements DHS acquisition decision event reviews with additional "gate" reviews that were adopted from Navy's acquisition processes.[17] The gate reviews allow both Coast Guard and Navy leadership to review and approve key documents before proceeding to the acquisition decision events. Each acquisition decision event is also overseen by acquisition oversight board with members from both the Coast Guard and the Navy (see figure 4).

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[13] GAO–09–322.

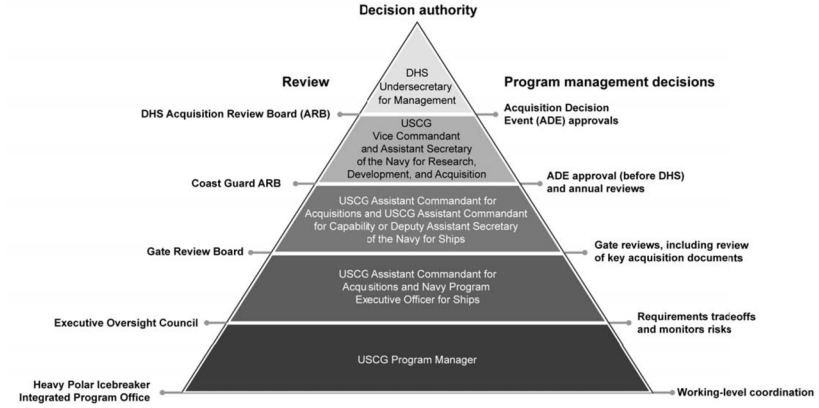
[14] GAO–18–600.

[15] GAO–18–600; GAO, *Coast Guard Acquisitions: Status of Coast Guard's Heavy Polar Icebreaker Acquisition,* GAO–18–385R (Washington, D.C.: Apr. 13, 2018).

[16] GAO–18–600.

[17] Acquisition decision events are milestone reviews in which the Coast Guard and DHS assess and verify an acquisition program's successful satisfaction of established exit criteria, affordability, and a readiness to move forward to the next acquisition phase.

Figure 4: Heavy Polar Icebreaker Oversight Boards and Approval Authorities



DHS = Department of Homeland Security

Source: GAO analysis of Coast Guard data. / GAO–19–147T

By collaborating with the Navy, the Coast Guard is leveraging the Navy's experience in ship design, cost estimating, contracting, and other shipbuilding processes. This partnership may allow the Coast Guard to more efficiently manage the polar icebreaker program.

In March 2017, NOAA indicated that it had partnered with the Navy through an interagency agreement to leverage the Navy's acquisition expertise for Auxiliary General Purpose Oceanographic Research Vessels, which will be the basis for a new class of NOAA ships. In April 2018, the Navy released the request for proposal for the preliminary contract design of this new class of ships.

Estimated Savings and Requirements Stability Should be Considered When Selecting Contracting Mechanisms

When acquiring multiple quantities of a product, agencies generally have several options for contracting mechanisms. Annual contracting, which can be considered the typical method, refers to awarding a contract for one year's worth of requirements. Annual contracting allows for the use of options for subsequent requirements. Options give the agency the unilateral right to purchase additional supplies or services called for by the contract, or to extend the term of the contract. Besides annual contracting with options, agencies may also be able to choose among other contracting mechanisms—multiyear contracting and "block buy" contracting, which are discussed in more detail below.

Multiyear Contracting Requirements and Considerations

Multiyear contracting allows agencies to acquire known requirements for up to 5 years under a single contract award, even though the total funds ultimately to be obligated may not be available at the time of contract award. Before DOD and Coast Guard can enter into a multiyear contract, certain criteria must be met.[18] Table 1 provides some of the multiyear contracting requirements for DOD and the Coast Guard.

[18] 10 U.S.C. § 2306b, implemented by Federal Acquisition Regulation (FAR) 17.105–1(b). NOAA may enter into a multiyear contact if the head of the contracting activity determines that the need is reasonably firm and continuing over the life of the contract and the contract will serve the best interests of the United States by encouraging full and open competition or promoting economy in administration, performance, and operation of the agency's programs. See FAR 17.105–1(a).

Table 1: Key Statutory Requirements for Department of Defense and Coast Guard Multiyear Procurement Candidates

Criteria	Description
Substantial savings	The head of the agency must find that use of a multiyear contract will result in significant savings in the total estimated costs when compared to the use of a series of annual contracts for the same procurement.
Stability of the requirement	The head of the agency must find that the minimum need to be purchased in terms of total quantity, production rate, and procurement rate is expected to be substantially unchanged during the multiyear contract period.
Stability of funding	The head of the agency must find that there is a reasonable expectation that sufficient funding will be requested to carry out the contract and avoid cancellation over the proposed multiyear contract period.
Stable design	The head of the agency must find that they have technical risks that are not excessive over the multiyear period and there is a stable design.
Realistic cost estimates	The head of the agency must find that estimates of contract cost and projected multiyear savings/cost avoidance through the use of a multiyear contract strategy are realistic.
National security	In the case of a purchase by the Department of Defense, the head of the agency must find that the use of a multiyear contracting strategy will promote the national security interests of the United States government.

Source: GAO analysis and 10 U.S.C. § 2306b. / GAO–19–147T

Multiyear contracts are expected to achieve lower unit costs compared to annual contracts through one or more of the following sources: (1) purchase of parts and materials in economic order quantities, (2) improved production processes and efficiencies, (3) better utilized industrial facilities, (4) limited engineering changes due to design stability during the multiyear period, and (5) cost avoidance by reducing the burden of placing and administering annual contracts.[19] Multiyear procurement also offers opportunities to enhance the industrial base by providing contractors a longer and more stable time horizon for planning and investing in production and by attracting subcontractors, vendors, and suppliers. However, multiyear procurement entails certain risks that must be balanced against the potential benefits, such as the increased costs to the government should the multiyear contract be changed or canceled and decreased annual budget flexibility for the program and across an agency's portfolio of acquisitions.

In February 2008, we found that it is difficult to precisely determine the impact of multiyear contracting on procurement costs.[20] For example, for three multiyear procurements (Air Force's C–17A Globemaster transport, the Navy's F/A–18E/F Super Hornet fighter, and the Army's Apache Longbow helicopter), we identified unit cost growth ranging from 10 to 30 percent compared to original estimates, due to changes in labor and material costs, requirements and funding, and other factors. In some cases, actual costs for the multiyear procurement were higher than original estimates for annual contracts. We noted that we could not determine how cost growth affected the level of savings achieved, if any, because we did not know how an alternative series of annual contracts would have fared. Although programs using annual contracts also have unit cost growth, it is arguably more problematic when using multiyear contracting because of the up-front investments and the government's exposure to risk over multiple years.

Block Buy Contracting Considerations

Block buy contracting generally refers to special legislative authority that agencies seek on an acquisition-by-acquisition basis to purchase more than one year's worth of requirements, such as purchasing supplies in economic order quantities. Unlike multiyear contracting, block buy contracting does not have permanent statutory criteria and, therefore, can be used in different ways.

We have previously analyzed several cases where block buy contracts were considered or used and have not found evidence of savings. For example:

- In September 2018, we found that for the polar icebreaker program, the Navy gave offerors an opportunity to provide the estimated savings that the government could achieve if it were to take a "block buy" approach in purchasing the

[19] Contracting for economic order quantities or bulk quantities generally refers to the purchase of parts in larger more economically efficient quantities to minimize the cost of these items.

[20] GAO, *Defense Acquisitions: DOD's Practices and Processes for Multiyear Procurement Should Be Improved,* GAO–08–298 (Washington, D.C.: Feb. 7, 2008).

ships or purchasing supplies in economic order quantities.[21] The Navy told us that they did not receive any formal responses from industry on potential savings from block buys or economic order quantities.

- In April 2017, we found that the Navy's Littoral Combat Ship contracts' block buy approach could affect Congress's funding flexibility.[22] Specifically, the block buy contracts provided that a failure to fully fund a purchase in a given year would make the contract subject to renegotiation, which provides a disincentive to the Navy or Congress to take any action that might disrupt the program because of the potential for the government to have to pay more for ships.
- In February 2005, we found that the Navy believed that a block-buy contract contributed to increased material costs for the Virginia class submarine.[23] Under this block-buy contract, subcontracts for submarine materials were for single ships spread over several years. According to the Navy, this type of acquisition approach did not take advantage of bulk-buy savings and incurred the risk that funding will not be available in time to order the material when needed.

Based on our prior work, it is important for agencies to consider multiple factors such as estimated savings, the stability of the requirements, quantities required, and potential contract terms and conditions before committing to a contracting mechanism approach.

In conclusion, as the Coast Guard and NOAA continue investing taxpayer dollars to modernize their fleets, they could benefit from the lessons learned from prior recapitalization and acquisition efforts. It is important for agencies to develop strategic and comprehensive approaches for managing their respective portfolios so that future requirements and capability gaps can be addressed in a timely manner. For each acquisition within their portfolios, agencies should ensure that they have established a sound business case before committing significant resources. Additionally, leveraging the Navy's resources and expertise in shipbuilding, such as by establishing integrated teams, could be beneficial by helping agencies be more efficient. Finally, when it comes to contracting mechanisms, factors such as estimated savings and program risks should be assessed before committing to a particular approach.

Chairman Sullivan, Ranking Member Baldwin, and Members of the Subcommittee, this concludes my prepared statement. I would be pleased to respond to any questions.

Senator SULLIVAN. Thank you, Ms. Mak, for that important testimony. We really appreciate it and look forward to some questions on it.

Mr. O'Rourke.

STATEMENT OF RONALD O'ROURKE, SPECIALIST IN NAVAL AFFAIRS, CONGRESSIONAL RESEARCH SERVICE

Mr. O'Rourke: Chairman Sullivan, Ranking Member Baldwin, and Distinguished Members of the Subcommittee, thank you for the opportunity to appear before you today to testify on Coast Guard and NOAA Fleet Recapitalization.

I've been covering military shipbuilding at CRS for 34 years and as a part of that, I've been covering Coast Guard shipbuilding for 20 years now.

Here are my main points. First, there has been some discussion recently of how certain Coast Guard programs would not be affordable if the Coast Guard procurement account in the coming years were limited to an average of about $1.1 billion a year.

The notion that the account will be limited to about $1.1 billion per year, however, is no longer strongly supported by recent data

[21] GAO–18–600.

[22] GAO, *Littoral Combat Ship and Frigate: Delaying Planned Frigate Acquisition Would Enable Better-Informed Decisions,* GAO–17–323 (Washington, D.C.: Apr. 18, 2017).

[23] GAO, *Defense Acquisitions: Improved Management Practices Could Help Minimize Cost Growth in Navy Shipbuilding Programs,* GAO–05–183 (Washington, D.C.: Feb. 28, 2005).

on funding requests, enacted funding levels, or projected future funding requests.

More important, in relation to maintaining Congress's status as a co-equal branch of government, including the preservation and use of congressional powers and prerogatives, an analysis that assumes or predicts that future funding levels will resemble past funding levels can encourage an artificially narrow view of congressional options regarding future funding levels which could deprive Congress of agency in the exercise of its constitutional power to set funding levels and determine the composition of Federal spending.

The Coast Guard is using a contract with options to build the first nine OPCs. A contract with options may look like a form of multiyear contracting but it's not multiyear contracting. A contract with options operates more like annual contracting and it cannot achieve the kinds of savings that are possible under multiyear contracting.

Using true multiyear contracting across the 25 Ship OPC Program could reduce its costs by as much as $1 billion. That's enough to pay for an icebreaker or for the entire waterways commerce cutter program.

This is a once-in-a-generation opportunity to save that much money on a Coast Guard acquisition program. Right now, however, because the Coast Guard is not using multiyear contracting for the OPC Program, we're on the cusp of not realizing a portion of that possible savings.

There has been interest in the question of whether something can be done to shorten the gap between the end of the medium endurance cutter's nominal service lives and their replacement by new ships.

There is something that could be done and that would be to increase the annual procurement rate of the replacement ships. That could be done by increasing the production rate at Eastern Shipbuilding if Eastern's capacity would permit that, by building OPCs at additional shipyards, such as Ballinger or Bath Iron Works, by building additional national security cutters at Ingalls, or by doing some combination of these things.

One of the most notable changes in the Polar Icebreaker Program has been the reduction in their estimated procurement costs. The costs had earlier been estimated at roughly $1 billion per ship but the Coast Guard and Navy informed CRS and CBO in March that they now believe the three heavy polar icebreakers could be acquired for an average of $700 million per ship. Other information identifies smaller reduction in procurement costs to something more than $900 million.

Reductions in the estimated procurement cost strengthen the business case for the program. A reduction to $700 million would strengthen it substantially. The icebreaker's cost could be further reduced by procuring them under a block by contract and by procuring both heavy and medium polar icebreakers to a common design as recommended in the National Academy's report.

There's a risk of the first icebreaker being delivered late. If a late delivery would extend the gap between the retirement of *Polar Star* and its replacement by the first new icebreaker, that could become an argument for starting construction of the new icebreaker as

soon as its design is brought to a high level of completion and the ship is otherwise ready to begin construction.

Finally, the NOAA Ship Recapitalization Plan presents some potential oversight issues for the Committee. One concerns the lack of visibility in NOAA's budget submission of the ship's unit procurement costs and the program's total procurement cost, which could affect the Committee's ability to conduct oversight of the program.

Another concerns the plan to build the eight new ships to four designs rather than to a smaller number of designs which could reduce opportunities for achieving certain economies in the program.

And the third concerns whether there are ways to use twin ship buys or multi-year contracting to reduce the cost of the ships without having to change very much the current plan to level fund the program at a figure of about $75 million a year.

Mr. Chairman, this concludes my statement. Thank you again for the opportunity to testify, and I look forward to the Subcommittee's questions.

[The prepared statement of Mr. O'Rourke follows:]

PREPARED STATEMENT OF RONALD O'ROURKE, SPECIALIST IN NAVAL AFFAIRS, CONGRESSIONAL RESEARCH SERVICE

Chairman Sullivan, Ranking Member Baldwin, distinguished members of the subcommittee, thank you for the opportunity to appear before you today to testify on Coast Guard and NOAA fleet recapitalization. Ship acquisition has been a major focus of my work as a CRS analyst on naval issues for the past 34 years. I have covered Coast Guard ship acquisition for Congress for 20 years[1] and last testified before this committee on the issue in 2005.[2] My biography is shown in *Appendix A*.

My CRS reports on Coast Guard cutter procurement and polar icebreaker procurement provide extensive discussions of the Coast Guard's National Security Cutter (NSC) program, Offshore Patrol Cutter (OPC) program, Fast Response Cutter (FRC) program and polar icebreaker program (recently renamed the Polar Security Cutter, or PSC, program).[3] As requested by the subcommittee, this statement provides some focused observations regarding these programs as well as the Coast Guard's Waterways Commerce Cutter (WCC) program and NOAA's fleet recapitalization effort.

Appendix B to this statement presents a general summary of some lessons learned in government shipbuilding. *Appendix C* presents some considerations relating to the use of warranties in government shipbuilding. *Appendix D* presents some considerations relating to avoiding procurement cost growth vs. minimizing procurement costs in government shipbuilding.

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[1] See, for example:

- CRS Report 98–830 F, *Coast Guard Integrated Deepwater System: Background and Issues for Congress,* by Ronald O'Rourke, first version October 5, 1998, final (*i.e.,* archived) version June 1, 2001;
- CRS Report RS21019, *Coast Guard Deepwater Program: Background and Issues for Congress,* by Ronald O'Rourke, first version September 25, 2001, final (*i.e.,* archived) version December 8, 2006;
- CRS Report RL33753, *Coast Guard Deepwater Acquisition Programs: Background, Oversight Issues, and Options for Congress,* by Ronald O'Rourke, first version December 18, 2006, final (*i.e.,* archived) version January 20, 2012;
- CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress,* by Ronald O'Rourke, first version June 13, 2012, current version August 3, 2018; and
- CRS Report RL34391, *Coast Guard Polar Icebreaker Program: Background and Issues for Congress,* by Ronald O'Rourke, first version February 26, 2008, current version August 3, 2018.

[2] See Statement of Ronald O'Rourke, Specialist in National Defense, Congressional Research Service, before the Senate Commerce, Science, and Transportation Committee, subcommittee on Fisheries and the Coast Guard, hearing on The Coast Guard's Revised Deepwater Implementation Plan, June 21, 2005, 15 pp.

[3] See the final two reports cited above in footnote 1.

Adequacy of Planned Quantities of NSCs, OPCs, and FRCs

The Coast Guard's 91-ship program of record (POR) for general-purpose cutters—which dates to 2004 and calls for a force of 8 NSCs, 25 OPCs, and 58 FRCs—will provide substantially more capability than the force of older-generation cutters it will replace. At the same time, it can be useful to recall that Coast Guard studies have concluded that the planned total of 91 NSCs, OPCs, and FRCs would provide only 61 percent of the NSCs, OPCs, and FRCs that would be needed to fully perform the service's statutory missions in coming years, in part because Coast Guard mission demands are expected to be greater in coming years than they were in the past. As shown in *Table 1,* the Coast Guard's 2011 Fleet Mix Analysis (FMA) Phase 2—the last general analysis of future Coast Guard ship force structure requirements to be publicly released by the Coast Guard—concluded that fully performing the Coast Guard's statutory missions in coming years would require a total of 149 NSCs, OPCs, and FRCs.[4] This point may be particularly salient right now in connection with the NSC and FRC programs, procurement of which would end soon under the POR figures.

Table 1. Program of Record Compared to Fleet Mix Analysis Phase 2 (2011)

Ship Type	Program of Record	Refined Objective Mix from Fleet Mix Analysis, Phase 2 (2011)
NSC	8	9
OPC	25	49
FRC	58	91
Total	91	149

Source: Coast Guard Fleet Mix Analysis, Phase 2, 2011, Table ES–2 on p. iv. For additional discussion, see Appendix A of CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress,* by Ronald O'Rourke.

PC&I Account Funding Levels

There has been some discussion recently of how certain Coast Guard procurement programs would not be affordable if the Coast Guard's Procurement, Construction, and Improvements (PC&I) account in coming years were limited to an average of about $1.1 billion per year.[5] An average PC&I funding level of about $1.1 billion per year would have that effect. In 2013, then-Coast Guard Commandant Robert Papp testified that an annual PC&I funding level of about $1 billion per year "almost creates a death spiral for the Coast Guard."[6] The notion that the PC&I funding level will be limited to an average of about $1.1 billion per year, however, is no longer strongly supported by recent data on Coast Guard annual funding re-

[4] For additional discussion, see Appendix A of CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress,* by Ronald O'Rourke.

[5] See Government Accountability Office, *Coast Guard Acquisitions[:] Actions Needed to Address Longstanding Portfolio Management Challenges,* GAO–18–454, July 2018, Figure 4 on page 22, and GAO's spoken testimony during the question-and-answer portion of a July 24, 2018, hearing on Coast Guard acquisition programs and mission balance and effectiveness before the Coast Guard and Maritime Transportation subcommittee of the House Transportation Committee, during which Figure 4, which depicts a funding funnel, was shown on the hearing room's display screens. (The funnel, which compares an annual PC&I account funding figure of $1.1 billion to a higher figure of $2 billion consistent with the Coast Guard's preferred PC&I account annual funding level, is not drawn to scale: Although $1.1 billion is 55 percent of $2 billion, the narrower $1.1-billion bottom of the funnel has an opening with a diameter than is no more than 22 percent as wide as that of the larger, $2-billion top of the funnel.) In report GAO–18–454, see also Figure 3 on page 15, which indicates an average requested funding level of about $1.1 billion per year for the period FY 2014–FY 2018, as well as the discussion on pages 13–14.

[6] Admiral Papp's spoken testimony during a May 14, 2013, hearing on the Coast Guard's proposed FY 2014 budget before the Homeland Security subcommittee of the Senate Appropriations Committee, as reflected in the transcript for the hearing.

quests,[7] annual enacted funding levels,[8] or projected future annual funding requests as shown in Coast Guard five-year Capital Investment Plans (CIPs).[9]

In assessing future funding levels for Executive Branch agencies, a common practice is to assume or predict that the figure in coming years will likely be close to where it has been in previous years. While this method can be of analytical and planning value, for an agency like the Coast Guard, which goes through periods with less acquisition of major platforms and periods with more acquisition of major platforms, this approach might not always be the best approach, at least for the PC&I account.

More important, in relation to maintaining Congress's status as a co-equal branch of government, including the preservation and use of congressional powers and prerogatives, an analysis that assumes or predicts that future funding levels will resemble past funding levels can encourage an artificially narrow view of congressional options regarding future funding levels, which could deprive Congress of agency in the exercise of its constitutional power to set funding levels and determine the composition of Federal spending.

As one example of how past funding levels were not the best guide to future funding levels, and of how Congress has exercised its constitutional power to set funding levels and determine the composition of Federal spending, during the period FY 2008–FY 2015, when the Navy's shipbuilding account averaged about $14.7 billion per year in then-year dollars, there was recurring discussion about the challenge of increasing the account to the substantially higher annual funding levels that would soon be needed to begin implementing the Navy's 30-year shipbuilding plan. Projections were prepared by CBO showing the decline in the size of the Navy that would occur over time if funding levels in the shipbuilding account did not increase substantially from the average level of about $14.7 billion per year. Congress, after assessing the situation, increased the shipbuilding account to $18.7 billion in FY 2016, $21.2 billion in FY 2017, $23.8 billion in FY 2018, and $24.2 billion in FY 2019. These increasing funding levels occurred even though the Budget Control Act, as amended, remained in operation during those years. At the most recent figure of $24.2 billion, the Navy's shipbuilding account is now 74 percent greater in then-year dollars than it was as recently as FY 2010.

Coast Guard's Non-Use of Multiyear Contracting

In connection with my work on ship acquisition, I maintain the CRS report on multiyear procurement (MYP) and block buy contracting.[10] In both that report and in testimony I have given to other committees in recent years on Coast Guard ship acquisition,[11] I have noted the stark contrast between the Navy—which uses multiyear contracting (in the form of MYP or block buy contracting) extensively to reduce its ship-and aircraft-procurement costs by billions of dollars—and the Coast Guard, which to date has never used multiyear contracting in one of its ship or aircraft acquisition programs.

The Navy in recent years, with congressional approval, has used multiyear contracting for, among other things, all three of its year-to-year shipbuilding programs—the Virginia-class attack submarine program, the DDG–51 destroyer pro-

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[7] While the Coast Guard's annual budget submissions for the five-year period FY 2014 through FY 2018 requested an average of about $1,065 million per year for the PC&I account, the Coast Guard's most recent request for the account—the request in its proposed FY 2019 budget—is for $1,886.8 million (a figure that reflects a late addition of $720 million to the request for the polar icebreaker program), and the Coast Guard's annual budget submissions for the five-year period FY 2009–FY 2013 requested an average of about $1,322 million for the account.

[8] Over the last 10 Fiscal Years (FY 2009–FY 2018), enacted funding levels for the PC&I account (including rescissions of unobligated balances) have averaged about $1,560 million per year. Only once during this period, in FY 2015, was the enacted figure less than $1,200 million (it was $1,166.6 million that year). In the other nine years, it was more than $1,200 million, and sometimes substantially more. The figures for the three most recent Fiscal Years—FY 2016, FY 2017, and FY 2018—were $1,928.4 million, $1,370.0 million, and $2,282.4 million, respectively.

[9] Although the projected funding requests in the FY 2014, FY 2015, and FY 2016 CIPs (showing figures for FY 2014–FY 2018, FY 2015–FY 2019, and FY 2016–FY 2020, respectively), averaged about $1,114.8 million per year, the projected funding requests in the FY 2017 CIP (for the period FY 2017–FY 2021) averaged about $1,427.5 million, and those in the FY 2018 CIP (for the period FY 2018–FY 2022) averaged about $1,533.1 million.

[10] CRS Report R41909, *Multiyear Procurement (MYP) and Block Buy Contracting in Defense Acquisition: Background and Issues for Congress,* by Ronald O'Rourke and Moshe Schwartz.

[11] See, for example, CRS Testimony TE10020, *Building a 21st Century Infrastructure for America: Coast Guard Sea, Air, and Land Capabilities: Part II,* by Ronald O'Rourke, and CRS Testimony TE10004, *The Status of Coast Guard Cutter Acquisition Programs,* by Ronald O'Rourke.

gram, and the Littoral Combat Ship (LCS) program.[12] The Navy has been using multiyear contracting for the Virginia-class and DDG–51 programs more or less continuously since the 1990s. Savings from the use of MYP recently have, among other things, helped Congress and the Navy to convert a nine-ship buy of DDG–51 class destroyers in FY 2013–FY 2017 into a 10-ship buy, and a nine-ship buy of Virginia-class attack submarines in FY 2014–FY 2018 into a 10-ship buy. The Navy is also now using block buy contracting in the John Lewis (TAO–205) class oiler program, and is considering or anticipating using them for procuring LPD–17 Flight II amphibious ships, FFG(X) frigates, and Columbia-class ballistic missile submarines. The Navy's use or prospective use of multiyear contracting for its year-to-year shipbuilding programs is arguably now almost more of a rule than an exception in Navy shipbuilding. For Congress, granting approval for using multiyear contracting involves certain tradeoffs, particularly in connection with retaining year-to-year control of funding.[13] In the case of Navy shipbuilding, Congress has repeatedly accepted these tradeoffs.

In contrast with Navy practice, the Coast Guard often uses contracts with options in its ship-procurement programs. Contracts with options can be referred to as *multiple-year* contracts, but they are not *multiyear* contracts. Instead, contracts with options operate more like annual contracts, and they cannot achieve the kinds of savings that are possible with multiyear contracts.[14] Like the other military services, the Coast Guard has statutory authority to use MYP contracting and can be granted authority by Congress to use block buy contracting.

National Security Cutter (NSC) Program

The NSCs were procured at irregular rather than regular intervals, and they were procured with annual rather than multiyear contracts. Both of these aspects of their acquisition made the ships more expensive. If NSCs had instead been procured at regular intervals under multiyear contracts that included authority for economic order quantity (EOQ) purchases (*i.e.,* up-front batch orders of selected components for some or all of the ships covered under the contract), the reduction in their combined procurement cost could have been substantial—possibly enough (or even more than enough) to have paid for one of the 11 NSCs that have been fully funded through FY 2018.

As discussed below in the section on the OPC program, building additional NSCs is one option for acquiring replacements for retiring medium-endurance cutters more quickly than currently planned, so as to close more quickly any gap in time between retirements of the medium-endurance cutters and the entry into service of their replacements. The NSCs are bigger and in some respects more capable than OPCs, and they would individually be more expensive to procure and to operate and support than OPCs. The difference in size, capability, and cost between the NSC and OPC design is not insignificant, but neither is it a night-and-day difference. With an estimated full-load displacement of 3,500 to 3,730 tons,[15] for example, OPCs are to be roughly 80 percent as large as NSCs, which have a full load dis-

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[12] The term year-to-year shipbuilding program is used here to mean a shipbuilding program in which at least one ship of that kind is procured each year. The Coast Guard plans to execute the OPC program as a year-to-year shipbuilding program.

[13] From a congressional perspective, tradeoffs in making greater use of multiyear contracting include the following: reduced congressional control over year-to-year spending and tying the hands of future Congresses; reduced flexibility for making changes in 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 EOQ purchases of components; the risk of having to make penalty payments to shipbuilders if multiyear contracts need to be terminated due to unavailability of funds needed 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. Congress has considered these tradeoffs in deciding whether to grant the Navy authority for using multiyear contracting in the service's shipbuilding and other acquisition programs.

[14] For additional discussion, see CRS Report R41909, *Multiyear Procurement (MYP) and Block Buy Contracting in Defense Acquisition: Background and Issues for Congress,* by Ronald O'Rourke and Moshe Schwartz, particularly the section entitled "MYP and BBC vs. Contracts with Options."

[15] As of May 26, 2017, the OPC's light ship displacement (*i.e.,* its "empty" displacement, without fuel, water, ballast, stores, and crew) was preliminarily estimated at about 2,640 to 2,800 tons, and its full load displacement was preliminarily estimated at about 3,500 to 3,730 tons. (Source: Figures provided to CRS by Coast Guard liaison office, May 26, 2017.)

placement of about 4,500 tons.[16] In terms of size, capability, and cost, the OPC is a lot closer to the NSC than it is to the FRC, which is a large patrol craft with a full load displacement of 353 tons.

Procurement of NSCs for replacing retiring Hamilton-class high-endurance cutters is approaching its end. If additional NSCs were procured in the near term in parallel with OPC procurement as part of a strategy for more quickly replacing retiring medium-endurance cutters, the additional NSCs could be built using the currently open NSC production line, avoiding a break in that production line and thereby maximizing production learning curve benefits. The procurement cost of any additional NSCs might be further reduced by procuring them at regular intervals and using an MYP contract.

OPC Program

The Coast Guard is using a contract with options to procure the first nine OPCs. As stated earlier, although a contract with options might look like a multiyear contract, it is not a form of multiyear contracting. A contract with options operates more like annual contracting and cannot achieve the kinds of savings that are possible with multiyear contracting.[17]

Using multiyear contracting in the 25-ship OPC program—specifically, block buy contracting with EOQ authority for the initial ships in the program, followed by either block buy contracting with EOQ authority or MYP contracting for later ships in the program—rather than annual contracting might reduce the total acquisition cost of the program by about $1 billion. This potential savings of $1 billion—a figure equal to or greater than the acquisition cost of either a polar icebreaker or a 35-ship Waterways Commerce Cutter program—represents a rare opportunity for using multiyear contracting to reduce the cost of an individual Coast Guard acquisition program by such an amount.

Acquiring the first nine ships in the OPC program under the current contract with options could forego roughly $350 million of the $1 billion in potential savings. Much of this $350 million in potential savings might be recaptured by renegotiating the current contract so as to convert it, with congressional approval, into a block buy contract with EOQ authority. If acquisition regulations prohibit such a renegotiation, the Coast Guard alternatively could choose to not exercise most of the options in the current contract and hold a new competition for building the current NSC design under a block buy contract. The current OPC builder—Eastern Shipbuilding of Panama City, FL—would be well positioned to win such a competition, since it would involve building Eastern's own design and Eastern would already have moved down the initial (*i.e.,* the steepest) part of the learning curve for building the design.

The current planned procurement profile for the OPC, which reaches a maximum projected rate of two ships per year, would deliver OPCs many years after the end of the originally planned service lives of the medium-endurance cutters that they are to replace. 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. There will be maintenance and repair expenses associated with extending the service lives of medium-endurance cutters, and if the Coast Guard does not also make investments to increase the capabilities of these ships, the ships may have less capability in certain regards than OPCs.

One possible option for addressing this situation would be to increase the maximum annual procurement rate of the replacement ships from the currently planned two ships per year to a higher figure. Increasing the rate to three or four ships per year, for example, could result in the 25th ship being delivered about four years or six years sooner, respectively, than under the currently planned maximum rate. Increasing the procurement rate would require a substantial increase to the Coast Guard's AC&I account, which gets back to the issue discussed earlier of future funding levels for that account and Congress's agency in setting funding levels and determining the composition of Federal spending.

From a production point of view, there are at least three options for increasing the annual procurement rate of replacement ships from the currently planned two ships per year to a higher rate, so as to close any gap in time between the retirements of medium-endurance cutters and the entry into service of their replacements. These options are as follows:

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[16] Source for figure of 4,500 tons: Coast Guard NSC fact sheet, accessed October 3, 2018, at: *https://www.dcms.uscg.mil/Portals/10/CG-9/Acquisition%20PDFs/Factsheets/NSC.pdf?ver=2017-04-24-142526-023.*

[17] For additional discussion, see CRS Report R41909, *Multiyear Procurement (MYP) and Block Buy Contracting in Defense Acquisition: Background and Issues for Congress,* by Ronald O'Rourke and Moshe Schwartz, particularly the section entitled "MYP and BBC vs. Contracts with Options."

- increasing the annual OPC production rate at Eastern Shipbuilding, if Eastern's capacity would permit this;
- building additional OPCs at one or two additional shipyards, such as Bollinger Shipyards of Lockport, LA and/or General Dynamics' Bath Iron Works (GD/BIW) of Bath, ME—the two other finalists in the OPC competition; and
- building additional NSCs at Huntington Ingalls Industries/Ingalls Shipbuilding (HII/Ingalls).

These three options are not mutually exclusive—they could be pursued in combination. Additional OPCs built at Bollinger and/or GD/BIW could be built to the OPC designs that those two shipbuilders submitted for the OPC competition. (Those designs are presumably optimized for the production facilities at Bollinger and GD/BIW. The Coast Guard, moreover, currently does not have data rights for the complete vessel design for Eastern's OPC design.[18]) Building additional OPCs at Bollinger and/or GD/BIW to the designs developed by those two shipbuilders would result in a fleet with two or three classes of OPCs, a situation that would increase OPC life-cycle operation and support costs and complicate the training and assignment of OPC crew members. These additional life-cycle costs and complications, however, might be deemed acceptable in return for avoiding the costs and risks of extending the service lives of medium-endurance cutters and shortening any gap in time between the retirement of medium-endurance cutters and the entry into service of their replacements. The Navy decided in 2010 to fill its requirement for LCSs by building two different LCS designs at the same time, and did so knowing that this would result in some additional life-cycle operation and support costs and crewing-related complications compared to the option of building all LCSs to a single design.[19] The option of building additional NSCs as replacements for retiring medium-endurance cutters was discussed above in the section on the NSC program.

FRC Program

With 50 FRCs procured through FY 2018 and four more requested for FY 2019, the FRC is approaching the 58-ship figure called for in the Coast Guard's program of record. As shown earlier in *Table 1,* however, the Coast Guard's 2011 Fleet Mix Analysis Phase II concluded that a total of 91 FRCs would be needed as part of an overall force of 149 general-purpose cutters to fully perform the service's statutory missions in coming years.

Procuring additional FRCs beyond the 58th would require additional procurement funding, which gets back to the issue discussed earlier of future funding levels for the PC&I account and Congress's agency in setting funding levels and determining the composition of Federal spending. As with the option discussed earlier of procuring additional NSCs, procuring additional FRCs immediately following the procurement of the 58th FRC would permit them to be built using the currently open NSC production line, avoiding a break in that production line and thereby maximizing production learning curve benefits. And as with the NSC option discussed earlier, the cost of any such additional FRCs could be reduced by procuring them under an MYP or block buy contract. The resulting increase in Coast Guard force structure from 58 FRCs to some higher number would increase long-term Coast Guard operation and support costs above currently planned levels.

Polar Security Cutter (PSC) (aka Polar Icebreaker)

Reduction in Estimated Procurement Cost and Business Case

One of the most notable changes in the PSC program over the last year or two has been the reduction in the estimated unit procurement cost of the ships. The procurement cost of a new heavy polar icebreaker had earlier been estimated informally at roughly $1 billion, but the Coast Guard and Navy informed CRS and CBO in March 2018 that they now believe that three polar icebreakers could be acquired for a total cost of about $2.1 billion, or an average of about $700 million per ship.[20] (The first ship will cost more than the other two because it will incorporate design costs for the class and be at the start of the production learning curve for the class.)

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[18] Source regarding data rights: E-mail from Coast Guard liaison office to CRS, September 6, 2017.

[19] For additional discussion of the LCS program, see CRS Report RL33741, *Navy Littoral Combat Ship (LCS) Program: Background and Issues for Congress,* by Ronald O'Rourke. A total of 35 LCSs have been funded through FY 2019. Of these 35 ships, 17 will be built to one of the LCS designs, and 18 will be built to the other.

[20] Source: March 16, 2018, Coast Guard-Navy briefing to CRS and CBO on the polar icebreaker program. For further discussion, see the section entitled "Estimated Acquisition Cost Has Declined Substantially" in CRS Report RL34391, *Coast Guard Polar Icebreaker Program: Background and Issues for Congress,* by Ronald O'Rourke.

Other information identifies a smaller reduction in procurement cost, to something more than $900 million per ship.[21] Other things held equal, reductions in the estimated unit procurement cost of the polar icebreaker strengthen the business case for the program. A reduction in estimated unit procurement cost to an average of $700 million per ship would strengthen it substantially.

Option for Block Buy Contract

The baseline plan for the PSC program calls for acquiring the ships using a contract with options, but Coast Guard and Navy officials are open to the idea of instead using a block buy contract to acquire at least some of the ships, and requested information on this possibility as part of the request for proposals (RFP) for the PSC program that was released on March 2, 2018. Using the above $2.1 billion estimated cost for a three-ship procurement of PSCs, and based on savings estimates provided by the Navy in the past for Navy shipbuilding programs that were being proposed for multiyear contracting, using a block buy contract that included EOQ purchases rather than a contract with options might reduce the combined acquisition cost of three PSCs by upwards of 7 percent, which could equate to a savings of upwards of $150 million.

A congressionally mandated July 2017 National Academies of Sciences, Engineering, and Medicine (NASEM) report on acquisition and operation of polar icebreakers states (emphasis as in original):

> *3. Recommendation: USCG should follow an acquisition strategy that includes block buy contracting with a fixed price incentive fee contract and take other measures to ensure best value for investment of public funds.*
>
> Icebreaker design and construction costs can be clearly defined, and a fixed price incentive fee construction contract is the most reliable mechanism for controlling costs for a program of this complexity. This technique is widely used by the U.S. Navy. To help ensure best long-term value, the criteria for evaluating shipyard proposals should incorporate explicitly defined lifecycle cost metrics. . . .
>
> A block buy authority for this program will need to contain specific language for economic order quantity purchases for materials, advanced design, and construction activities. A block buy contracting program with economic order quantity purchases enables series construction, motivates competitive bidding, and allows for volume purchase and for the timely acquisition of material with long lead times. It would enable continuous production, give the program the maximum benefit from the learning curve, and thus reduce labor hours on subsequent vessels. . ..
>
> If advantage is taken of learning and quantity discounts available through the recommended block buy contracting acquisition strategy, the average cost per heavy icebreaker is approximately $791 million, on the basis of the acquisition of four ships.[22]

Although Coast Guard officials have expressed interest in using a block buy contract for procuring PSCs, they are considering the option of procuring the first PSC under a single-ship contract and then using a block buy contract to procure subsequent PSCs. In support of that option, Coast Guard officials have noted the risks involved in building a lead ship and the fact that the United States has not built a heavy polar icebreaker in more than 40 years. Opponents of including the first PSC in a block buy contract might argue, for example, that problems with the design of PSC components might be transmitted from the first PSC to later PSCs by up-front EOQ purchases of those components made under a block buy contract. They might additionally argue that excluding the first PSC from a block buy contract preserves more government flexibility on whether and when to procure a sec-

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[21] May 2018 GAO report states that the acquisition program baseline (APB) approved for the polar icebreaker program in January 2018 estimated the program's acquisition cost at $3.207 million, and that the "current estimate" of the program's acquisition as of January 2018 was $2,789 million, or an average of about $930 million per ship. (Government Accountability Office, *Homeland Security Acquisitions[:] Leveraging Programs' Results Could Further DHS's Progress to Improve Portfolio Management,* GAO–18–339SP, May 2018, p. 85.) See also Government Accountability Office, *Coast Guard Acquisitions[:] Actions Needed to Address Longstanding Portfolio Management Challenges,* GAO–18–454, July 2018, which states on page 18 that "The polar icebreaker program has an estimated total acquisition cost of more than $3 billion. . .."

[22] 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. 14, 15.

ond PSC, which could be advantageous for responding to potential changes in operational needs or budgetary circumstances.

Supporters of including the first PSC in a block buy contract could argue that block buy contracting was invented to a large degree expressly to permit a lead ship to be included in the contract, that the Navy has included lead ships in block buy contracts in the Virginia-class attack submarine program and the TAO-205 class oiler program, and that the Navy is considering using a block buy contract that includes the lead ship for procuring the initial ships in the Columbia-class ballistic missile submarine program. The comparison with the Navy's plans for the Columbia class, they could argue, is of particular note, because the United States has not procured the lead ship of a new class of ballistic missile submarines in more than 40 years, the Columbia-class design is more complex in certain regards than the PSC design, and the Columbia-class design will incorporate a new-design electric-drive propulsion plant—something that the United States has never before done on a series-production nuclear-powered submarine.

The lead ship in the PSC program will carry a risk of requiring design changes to fix problems in the design that are only discovered as a result of building the design. That risk, however, will exist regardless of whether the lead ship is built under a single-ship contract of a block buy contract, and it is not clear how much more chance there would be under a block buy contract of transmitting any such design problems to the second PSC, because the Coast Guard's notional schedule for the PSC program calls for procuring the second ship about 18 months after the first (*i.e.,* while construction of the first PSC is still in progress). To the extent that there would be a greater chance of transmitting design problems to the second PSC under a block buy contract, the question would then become one of weighing the potential cost of fixing those design problems against the added economies of including the first PSC in a block buy contract. Supporters of including the lead ship in a block buy contract could argue that the risks of encountering a design problem in the first ship have been mitigated by the industry's shift since the last polar icebreakers were built from paper designs to computer-aided design, by the Navy's involvement in the PSC program, and by the PSC program's strategy of using a parent design (*i.e.,* an existing polar-capable icebreaker design) as the basis for the PSC design. As shown in *Appendix B,* a key lesson-learned in government shipbuilding is to bring the design of the ship in question to a high level of completion before beginning construction of the ship, precisely so as to minimize the risk of design problems. Supporters of including the lead ship in a block buy contract could argue that if there is a significant risk of substantial design problems in the lead ship, that is not an argument against including the lead ship in a block buy contract—it is an argument against beginning construction of the ship under any form of contract.

Risk of Delayed Delivery of Lead Ship

GAO has identified a risk of the first PSC being delivered late.[23] I agree with that assessment. The Navy's experience in building lead ships suggests that there is a substantial risk of the lead PSC being delivered late—perhaps as much as a year or more later than scheduled. A late delivery could equate to an increase in the cost of building the ship, because it could reflect having to use more labor hours to build the ship than had been estimated, and because the ship will absorb more of the shipyard's overhead costs by remaining in the shipyard for a longer period of time. The government can insulate itself against the risk of such cost growth by using a fixed-price contract to build the ship (which the Coast Guard and Navy plan to do).

The possibility of a late delivery is something the Coast Guard and Congress may consider preparing for in terms of investments for maintaining *Polar Star* as an operational ship and/or seeking a short-term bridging charter of a foreign polar icebreaker. To the extent that a delay in delivering the lead ship would extend a gap in time between the retirement of *Polar Star* and the entry into service of the first PSC, that could become an argument for starting construction of the lead PSC as soon as its design is brought to a high level of completion and the ship is otherwise ready to begin construction.

Option for Using a Common Design for Heavy and Medium PSCs

The Coast Guard envisages procuring up to three new medium icebreakers after it procures three new heavy polar icebreakers—a plan known as 3+3. The July 2017

[23] See GAO's spoken testimony during the question-and-answer portion of a July 24, 2018, hearing on Coast Guard acquisition programs and mission balance and effectiveness before the Coast Guard and Maritime Transportation subcommittee of the House Transportation Committee, as reflected in the transcript of the hearing.

NASEM report concluded that notional operational requirements for new medium polar icebreakers would result in ships that would not be too different in size from new heavy polar icebreakers. (That is not be particularly surprising—the Coast Guard's current medium polar icebreaker, *Healy,* is actually somewhat larger than the Coast Guard's heavy polar icebreaker, *Polar Star. Healy* has less icebreaking capability than *Polar Star,* but more capacity for supporting onboard science operations.) Given this probable similarity in size, the NASEM report recommended building a single medium polar icebreaker to the same common design as the three new heavy polar icebreakers (*i.e.,* 4+0), and operating these four new ships in conjunction with *Healy* to produce a five-ship polar icebreaker fleet. The 4+0 production strategy, the report concluded, would reduce the cost of the medium icebreaker by avoiding the cost of developing a second icebreaker design and 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. An abstract from the NASEM report on this proposal is shown in *Appendix E* to this statement.

If policymakers decide to procure a second or third new medium polar icebreaker, the same general approach recommended by the NASEM report could be followed, leading to a 5+0 or 6+0 acquisition. The potential percentage savings under a five- or six-ship block buy contract with EOQ authority could be greater than the figure of upwards of 7 percent mentioned earlier for a three-ship block buy—they could be closer to 10 percent. Building a single common icebreaker design rather than two designs to meet needs for heavy and medium polar icebreakers might also reduce life-cycle operation and support costs.

An April 12, 2018, press report states:

> As the Coast Guard prepares to review industry bids for a new heavy polar icebreaker, the service is keeping its options open for the right number and mix of polar icebreakers it will need in the future, Adm. Paul Zukunft, the [then-]commandant of the Coast Guard, said on Wednesday [April 11].
>
> The Coast Guard's program of record is for three heavy and three medium polar icebreakers but Zukunft said the "jury is still out" whether that will remain so. Right now, the service is aiming toward building three new heavy icebreakers, but it might make sense just to keep building these ships, he told reporters at a Defense Writers Group breakfast in Washington, D.C.
>
> Zukunft said that "when you start looking at the business case after you build three, and then you need to look at what is the economy of scale when you start building heavy icebreakers, and would it be less expensive to continue to build heavies and not mediums." He added that the heavy icebreakers provide more capability, and if the price is "affordable" and in "the same range" as building medium icebreakers, then "maybe you end up with one class of heavy icebreakers."
>
> Building only one class of ships has a number of advantages in terms of maintenance, crew familiarity, configuration management, and more, he said. A decision on what the future icebreaker fleet will consist of is "still probably several years out. . .. but that's one option that we want to keep open going forward," Zukunft said.[24]

WCC Program

The WCC program—the program to replace the Coast Guard's current 35-ship inland waterways fleet—is a smaller program than those discussed above. With a notional procurement cost of roughly $25 million per cutter, a 35-ship replacement program might have a total acquisition cost of roughly $900 million.[25] Although the scale of the program is more modest than that of the NSC, OPC, and FRC programs, the WCC program is of importance in terms of its economic benefit to the Nation (by supporting waterborne commerce) and the bidding opportunity it will

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[24] Calvin Biesecker, "Coast Guard Leaving Options Open For Future Polar Icebreaker Fleet Type," Defense Daily, April 12, 2018. Ellipsis as in original.

[25] Source for $25 million figure: Spoken testimony of Coast Guard Commandant Karl Schultz during the question-and-answer portion of a September 16, 2018, hearing on Coast Guard modernization and recapitalization before the Coast Guard and Maritime Transportation subcommittee of the House transportation and Infrastructure Committee, as reflected in the transcript of the hearing. The Commandant stated: "I'm loathed to put a number out, but I think you're talking a $25 million, plus or minus, [cost per] ship." The planned number of new replacement WCCs has not yet been determined and could turn out to be something other than 35. GAO states that "according to Coast Guard officials, the preliminary rough order of magnitude estimate for total acquisition cost is $1.1 billion." Government Accountability Office, *Coast Guard Acquisitions[:] Actions Needed to Address Longstanding Portfolio Management Challenges,* GAO–18–454, July 2018, p. 19.

provide to U.S. shipyards that are not capable of building larger Coast Guard cutters.

As the Coast Guard begins to develop the details of this program, potential oversight issues for the subcommittee could include, among other things, the planned number of replacement cutters (which has not yet been determined and could turn out to be something other than 35), planned annual procurement quantities and the resulting schedule for replacing the existing ships, whether to develop a new design or instead use a parent design, the number of shipyards to be used to build the ships, and the contracting strategy, including whether to use multiyear contracting.

NOAA Fleet Recapitalization

NOAA is now in the opening stages of its effort to procure eight new ships to replace eight aged ships within its 16-ship research fleet. Current plans call for the eight-ship recapitalization effort to be level-funded at $75 million per year. Building these ships could provide work to shipyards that are not capable of building larger Navy or Coast Guard ships. They could also help a shipyard involved in building larger Navy or Coast Guard ships to fill in temporary dips in their Navy or Coast Guard workloads, which might permit the Navy or Coast Guard ships in question to be built at lower cost. With procurement of the eight new NOAA ships now beginning, the effort presents some potential oversight issues for the subcommittee.

Unit Procurement Cost and Total Program Procurement Cost

One of these concerns the visibility of the estimated unit procurement costs of the new ships and the estimated total procurement cost of the eight-ship effort. These figures—which are basic points of information for Congress for supporting potential consideration of budget tradeoffs and for use as baselines in monitoring program execution—are not clearly visible in NOAA's FY 2019 budget justification book. It is difficult, moreover, to calculate what the unit procurement cost might be using the information in the budget justification book, since the program is level-funded at $75 million per year, there is a different combination of activities to be funded each year under that funding figure, and the individual costs of these activities are not broken out. One option the subcommittee may wish to consider would be to request or direct NOAA to include the ships' estimated unit procurement costs and the program's estimated total procurement cost in its annual budget justification book.

Number of New Designs

A second potential oversight issue for the subcommittee concerns the number of new designs that NOAA is planning to use for building for the eight new ships. NOAA is currently planning to build the new ships to four designs, meaning an average of two ships per design. Compared to a strategy of building the eight ships to fewer than four designs, NOAA's planned approach could increase total design costs, reduce opportunities for achieving shipyard production learning curve benefits, and reduce economies of scale in life-cycle operation and support costs.

In a telephone consultation with CRS, NOAA officials stated that the option of building the eight ships to a smaller number of designs was considered for exactly these reasons, but that the decision was to instead plan for four different designs because of the differing operational requirements of the eight ships. Building a common design capable of handling these differing requirements, NOAA stated, would result in a design that would be bigger—and thus more expensive both to procure and to operate and support—than would be needed for some of the eight ships, and these additional procurement and life-cycle operation and support costs were greater than the potential savings of building the ships to a smaller number of designs.[26] That explanation is quite plausible. One option the subcommittee may wish to consider would be to request or direct NOAA to provide the details of its analysis on the comparative design, procurement, and life-cycle operation and support costs of building four designs vs. a smaller number of designs, so that the subcommittee, as a matter of due diligence, can examine the Coast Guard's analysis of this issue.

Multiple-Ship Buys or Block Buy Contracting

NOAA's current plan is to use a series of contracts with options to procure the eight new ships.[27] There could, for example, be four contracts (one for each design), with each contract being for the design and construction of one ship, with an option for building a second. This approach would preserve more government flexibility in deciding whether to procure a second ship to a given design, provide multiple bid-

[26] Source: Telephone conversation between CRS and NOAA September 28, 2018.
[27] Source: Telephone conversation between CRS and NOAA September 28, 2018.

ding opportunities for shipyards interested in building the ships, and create a potential for building the ships in multiple shipyards, all of which policymakers may view as benefits. On the other hand, this approach would forego the potential savings that might be realized through multiple-ship buys (*e.g.,* procuring two ships of a given design in a single year) or block buy contacting. One option the subcommittee may wish to consider would be to request or direct NOAA to devise and share with the subcommittee options (including estimates of potential savings) for making use of multiple-ship buys and block buy contracting while staying, as much as possible, within the level funding profile of $75 million per year.

Life-Cycle Support

NOAA has not yet begun to scope out in detail the life-cycle support plan for the eight new ships—that work, NOAA officials stated, may start a couple of years from now.[28] One option the subcommittee may wish to consider would be to request that NOAA keep the subcommittee apprised of its efforts to develop a life-cycle support plan for the ships.

Chairman Sullivan, this concludes my statement. Thank you again for the opportunity to testify, and I will be pleased to respond to any questions the subcommittee may have.

APPENDIX A. BIOGRAPHY—RONALD O'ROURKE

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 CRS. He has written many reports for Congress on various issues relating to the Navy, the Coast Guard, defense acquisition, China's naval forces and maritime territorial disputes, the Arctic, the international security environment, and the U.S. role in the world. 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.

APPENDIX B. A SUMMARY OF SOME ACQUISITION LESSONS LEARNED FOR GOVERNMENT SHIPBUILDING

This appendix presents a general summary of lessons learned in government shipbuilding, reflecting comments made repeatedly by various sources over the years.[29] These lessons learned include the following:

- *At the outset, get the operational requirements for the program right.* Properly identify the program's operational requirements at the outset. Manage risk by not trying to do too much in terms of the program's operational requirements, and perhaps seek a so-called 70 percent-to-80 percent solution (*i.e.,* a design that is intended to provide 70 percent-80 percent of desired or ideal capabilities). Achieve a realistic balance up front between operational requirements, risks, and estimated costs.
- *Impose cost discipline up front.* Use realistic price estimates, and consider not only development and procurement costs, but life-cycle operation and support (O&S) costs.

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[28] Source: Telephone conversation between CRS and NOAA September 28, 2018.

[29] This appendix is adapted from Appendix J of CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress,* by Ronald O'Rourke. See also Government Accountability Office, *Navy Shipbuilding[:] Past Performance Provides Valuable Lessons for Future Investments,* GAO–18–238SP, June 2018, 36 pp.

- *Employ competition* where possible in the awarding of design and construction contracts.
- *Use a contract type that is appropriate for the amount of risk involved,* and structure its terms to align incentives with desired outcomes.
- *Minimize design/construction concurrency* by developing the design to a high level of completion before starting construction and by resisting changes in requirements (and consequent design changes) during construction.
- *Properly supervise construction work.* Maintain an adequate number of properly trained Supervisor of Shipbuilding (SUPSHIP) personnel.
- *Provide stability for industry,* in part by using, where possible, multiyear procurement (MYP) or block buy contracting.
- *Maintain a capable government acquisition workforce* that understands what it is buying, as well as the above points.

Identifying these lessons is arguably not the hard part—most if not all these points have been cited for years. The hard part, arguably, is living up to them without letting circumstances lead program-execution efforts away from these guidelines.

APPENDIX C. SOME CONSIDERATIONS RELATING TO WARRANTIES IN GOVERNMENT SHIPBUILDING AND OTHER GOVERNMENT ACQUISITION

This appendix presents some considerations relating to warranties in shipbuilding and other defense acquisition.[30]

In discussions of government shipbuilding, one question that sometimes arises is whether including a warranty in a shipbuilding contract is preferable to not including one. The question can arise, for example, in connection with a GAO finding that "the Navy structures shipbuilding contracts so that it pays shipbuilders to build ships as part of the construction process and then pays the same shipbuilders a second time to repair the ship when construction defects are discovered."[31]

Including a warranty in a shipbuilding contract (or a contract for building some other kind of end item), while potentially valuable, might not always be preferable to not including one—it depends on the circumstances of the acquisition, and it is not necessarily a valid criticism of an acquisition program to state that it is using a contract that does not include a warranty (or a weaker form of a warranty rather than a stronger one).

Including a warranty generally shifts to the contractor the risk of having to pay for fixing problems with earlier work. Although that in itself could be deemed desirable from the government's standpoint, a contractor negotiating a contract that will have a warranty will incorporate that risk into its price, and depending on how much the contractor might charge for doing that, it is possible that the government could wind up paying more in total for acquiring the item (including fixing problems with earlier work on that item) than it would have under a contract without a warranty.

When a warranty is not included in the contract and the government pays later on to fix problems with earlier work, those payments can be very visible, which can invite critical comments from observers. But that does not mean that including a warranty in the contract somehow frees the government from paying to fix problems with earlier work. In a contract that includes a warranty, the government will indeed pay something to fix problems with earlier work—but it will make the payment in the less-visible (but still very real) form of the up-front charge for including the warranty, and that charge might be more than what it would have cost the government, under a contract without a warranty, to pay later on for fixing those problems.

From a cost standpoint, including a warranty in the contract might or might not be preferable, depending on the risk that there will be problems with earlier work that need fixing, the potential cost of fixing such problems, and the cost of including the warranty in the contract. The point is that the goal of avoiding highly visible payments for fixing problems with earlier work and the goal of minimizing the cost to the government of fixing problems with earlier work are separate and different

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[30] This appendix is adapted from Appendix K of CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress,* by Ronald O'Rourke.

[31] See Government Accountability Office, *Navy Shipbuilding[:] Past Performance Provides Valuable Lessons for Future Investments,* GAO–18–238SP, June 2018, p. 21. A graphic on page 21 shows a GAO finding that the government was financially responsible for shipbuilder deficiencies in 96 percent of the cases examined by GAO, and that the shipbuilder was financially responsible for shipbuilder deficiencies in 4 percent of the cases.

goals, and that pursuing the first goal can sometimes work against achieving the second goal.[32]

The Department of Defense's guide on the use of warranties states the following:

> Federal Acquisition Regulation (FAR) 46.7 states that "the use of warranties is not mandatory." However, if the benefits to be derived from the warranty are commensurate with the cost of the warranty, the CO [contracting officer] should consider placing it in the contract. In determining whether a warranty is appropriate for a specific acquisition, FAR Subpart 46.703 requires the CO to consider the nature and use of the supplies and services, the cost, the administration and enforcement, trade practices, and reduced requirements. The rationale for using a warranty should be documented in the contract file. . ..
>
> In determining the value of a warranty, a CBA [cost-benefit analysis] is used to measure the life cycle costs of the system with and without the warranty. A CBA is required to determine if the warranty will be cost beneficial. CBA is an economic analysis, which basically compares the Life Cycle Costs (LCC) of the system with and without the warranty to determine if warranty coverage will improve the LCCs. In general, five key factors will drive the results of the CBA: cost of the warranty + cost of warranty administration + compatibility with total program efforts + cost of overlap with Contractor support + intangible savings. Effective warranties integrate reliability, maintainability, supportability, availability, and life-cycle costs. Decision factors that must be evaluated include the state of the weapon system technology, the size of the warranted population, the likelihood that field performance requirements can be achieved, and the warranty period of performance.[33]

APPENDIX D. SOME CONSIDERATIONS RELATING TO AVOIDING PROCUREMENT COST GROWTH VS. MINIMIZING PROCUREMENT COSTS

This appendix presents some considerations relating to avoiding procurement cost growth vs. minimizing procurement costs in shipbuilding and other government acquisition.[34]

The affordability challenge posed by the Navy's shipbuilding plans can reinforce the strong oversight focus on preventing or minimizing procurement cost growth in Navy shipbuilding programs, which is one expression of a strong oversight focus on preventing or minimizing cost growth in DOD acquisition programs in general. This oversight focus may reflect in part an assumption that avoiding or minimizing procurement cost growth is always synonymous with minimizing procurement cost. It is important to note, however, that as paradoxical as it may seem, avoiding or minimizing procurement cost growth is not always synonymous with minimizing procurement cost, and that a sustained, singular focus on avoiding or minimizing procurement cost growth might sometimes lead to higher procurement costs for the government.

How could this be? Consider the example of a design for the lead ship of a new class of Navy ships. The construction cost of this new design is uncertain, but is estimated to be likely somewhere between Point A (a minimum possible figure) and Point D (a maximum possible figure). (Point D, in other words, would represent a cost estimate with a 100 percent confidence factor, meaning there is a 100 percent chance that the cost would come in at or below that level.) If the Navy wanted to avoid cost growth on this ship, it could simply set the ship's procurement cost at Point D. Industry would likely be happy with this arrangement, and there likely would be no cost growth on the ship.

The alternative strategy open to the Navy is to set the ship's target procurement cost at some figure between Points A and D—call it Point B—and then use that

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[32] It can also be noted that the country's two largest builders of Navy ships—General Dynamics (GD) and Huntington Ingalls Industries (HII)—derive about 60 percent and 96 percent, respectively, of their revenues from U.S. government work. (See General Dynamics, *2016 Annual Report,* page 9 of Form 10–K [PDF page 15 of 88]) and Huntington Ingalls Industries, *2016 Annual Report,* page 5 of Form 10–K [PDF page 19 of 134]). Thus, even if a warranty in a shipbuilding contract with one of these firms were to somehow mean that the government did not have pay under the terms of that contract—either up front or later on—for fixing problems with earlier work done under that contract, there would still be a question as to whether the government would nevertheless wind up eventually paying much of that cost as part of the price of one or more future contracts the government may have that firm.

[33] Department of Defense, *Department of Defense Warranty Guide,* Version 1.0, September 2009, accessed July 13, 2017, at *https://www.acq.osd.mil/dpap/pdi/uid/docs/departmentofdefensewarrantyguide[1].doc.*

[34] This appendix is adapted from Appendix L of CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress,* by Ronald O'Rourke.

more challenging target cost to place pressure on industry to sharpen its pencils so as to find ways to produce the ship at that lower cost. (Navy officials sometimes refer to this as "pressurizing" industry.) In this example, it might turn out that industry efforts to reduce production costs are not successful enough to build the ship at the Point B cost. As a result, the ship experiences one or more rounds of procurement cost growth, and the ship's procurement cost rises over time from Point B to some higher figure—call it Point C.

Here is the rub: Point C, in spite of incorporating one or more rounds of cost growth, might nevertheless turn out to be lower than Point D, because Point C reflected efforts by the shipbuilder to find ways to reduce production costs that the shipbuilder might have put less energy into pursuing if the Navy had simply set the ship's procurement cost initially at Point D.

Setting the ship's cost at Point D, in other words, may eliminate the risk of cost growth on the ship, but does so at the expense of creating a risk of the government paying more for the ship than was actually necessary. DOD could avoid cost growth on new procurement programs starting tomorrow by simply setting costs for those programs at each program's equivalent of Point D. But as a result of this strategy, DOD could well wind up leaving money on the table in some instances—of not, in other words, minimizing procurement costs.

DOD does not have to set a cost precisely at Point D to create a potential risk in this regard. A risk of leaving money on the table, for example, is a possible downside of requiring DOD to budget for its acquisition programs at something like an 80 percent confidence factor—an approach that some observers have recommended—because a cost at the 80 percent confidence factor is a cost that is likely fairly close to Point D.

Procurement cost growth is often embarrassing for DOD and industry, and can damage their credibility in connection with future procurement efforts. Procurement cost growth can also disrupt congressional budgeting by requiring additional appropriations to pay for something Congress thought it had fully funded in a prior year. For this reason, there is a legitimate public policy value to pursuing a goal of having less rather than more procurement cost growth.

Procurement cost growth, however, can sometimes be in part the result of DOD efforts to use lower initial cost targets as a means of pressuring industry to reduce production costs—efforts that, notwithstanding the cost growth, might be partially successful. A sustained, singular focus on avoiding or minimizing cost growth, and of punishing DOD for all instances of cost growth, could discourage DOD from using lower initial cost targets as a means of pressurizing industry, which could deprive DOD of a tool for controlling procurement costs.

The point here is not to excuse away cost growth, because cost growth can occur in a program for reasons other than DOD's attempt to pressurize industry. Nor is the point to abandon the goal of seeking lower rather than higher procurement cost growth, because, as noted above, there is a legitimate public policy value in pursuing this goal. The point, rather, is to recognize that this goal is not always synonymous with minimizing procurement cost, and that a possibility of some amount of cost growth might be expected as part of an optimal government strategy for minimizing procurement cost. Recognizing that the goals of seeking lower rather than higher cost growth and of minimizing procurement cost can sometimes be in tension with one another can lead to an approach that takes both goals into consideration. In contrast, an approach that is instead characterized by a sustained, singular focus on avoiding and minimizing cost growth may appear virtuous, but in the end may wind up costing the government more.

APPENDIX E. NASEM REPORT RECOMMENDATION FOR BUILDING HEAVY AND MEDIUM POLAR ICEBREAKERS TO A COMMON DESIGN

Regarding its proposal to build heavy and medium polar icebreakers to a common design, the July 2017 NASEM report stated (emphasis as in original):

> *2. Recommendation: The United States Congress should fund the construction of four polar icebreakers of common design that would be owned and operated by the United States Coast Guard (USCG).*
>
> The current Department of Homeland Security (DHS) Mission Need Statement. . . contemplates a combination of medium and heavy icebreakers. The committee's recommendation is for a single class of polar icebreaker with heavy icebreaking capability. Proceeding with a single class means that only one design will be needed, which will provide cost savings. The committee has found that the fourth heavy icebreaker could be built for a lower cost than the lead ship of a medium icebreaker class. . . .

The DHS Mission Need Statement contemplated a total fleet of "potentially" up to six ships of two classes—three heavy and three medium icebreakers. Details appear in the High Latitude Mission Analysis Report. The Mission Need Statement indicated that to fulfill its statutory missions, USCG required three heavy and three medium icebreakers; each vessel would have a single crew and would homeport in Seattle. The committee's analysis indicated that four heavy icebreakers will meet the statutory mission needs gap identified by DHS for the lowest cost. . . .

4. Finding: In developing its independent concept designs and cost estimates, the committee determined that the costs estimated by USCG for the heavy icebreaker are reasonable. However, the committee believes that the costs of medium icebreakers identified in the High Latitude Mission Analysis Report are significantly underestimated. . . .

Although USCG has not yet developed the operational requirements document for a medium polar icebreaker, the committee was able to apply the known principal characteristics of the USCG Cutter Healy to estimate the scope of work and cost of a similar medium icebreaker. The committee estimates that a first-of-class medium icebreaker will cost approximately $786 million. The fourth ship of the heavy icebreaker series is estimated to cost $692 million. Designing a medium-class polar icebreaker in a second shipyard would incur the estimated engineering, design, and planning costs of $126 million and would forgo learning from the first three ships; the learning curve would be restarted with the first medium design. Costs of building the fourth heavy icebreaker would be less than the costs of designing and building a first-of-class medium icebreaker. . . .

6. Recommendation: USCG should ensure that the common polar icebreaker design is science-ready and that one of the ships has full science capability.

All four proposed ships would be designed as "science-ready," which will be more cost-effective when one of the four ships—most likely the fourth—is made fully science capable. Including science readiness in the common polar icebreaker design is the most cost-effective way of fulfilling both the USCG's polar missions and the Nation's scientific research polar icebreaker needs. . . . The incremental costs of a science-ready design for each of the four ships ($10 million to $20 million per ship) and of full science capability for one of the ships at the initial build (an additional $20 million to $30 million) are less than the independent design and build cost of a dedicated research medium icebreaker. . . . In briefings at its first meeting, the committee learned that the National Science Foundation and other agencies do not have budgets to support full-time heavy icebreaker access or the incremental cost of design, even though their science programs may require this capability. Given the small incremental cost, the committee believes that the science capability cited above should be included in the acquisition costs.

Science-ready design includes critical elements that cannot be retrofitted cost-effectively into an existing ship and that should be incorporated in the initial design and build. Among these elements are structural supports, appropriate interior and exterior spaces, flexible accommodation spaces that can embark up to 50 science personnel, a hull design that accommodates multiple transducers and minimizes bubble sweep while optimizing icebreaking capability, machinery arrangements and noise dampening to mitigate interference with sonar transducers, and weight and stability latitudes to allow installation of scientific equipment. Such a design will enable any of the ships to be retrofitted for full science capability in the future, if necessary. . . .

Within the time frame of the recommended build sequence, the United States will require a science-capable polar icebreaker to replace the science capabilities of the Healy upon her retirement. To fulfill this need, one of the heavy polar icebreakers would be procured at the initial build with full science capability; the ability to fulfill other USCG missions would be retained. The ship would be outfitted with oceanographic overboarding equipment and instrumentation and facilities comparable with those of modern oceanographic research vessels. Some basic scientific capability, such as hydrographic mapping sonar, should be acquired at the time of the build of each ship so that environmental data that are essential in fulfilling USCG polar missions can be collected.[35]

[35] 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.

Senator SULLIVAN. Thank you, Mr. O'Rourke, and I appreciate you and CRS's serious work and detailed comments and your continuing involvement and oversight, helping us with oversight, very, very important. So thank you.

Let me begin the questioning. Admiral, I wanted to talk a little bit about what seems to be a misalignment of demands and capabilities.

I think it's pretty safe to say that Coast Guard cutters fleet, it's smaller, certainly smaller than it was 15 years ago, but the demands, as I kind of hinted at and so did Senator Baldwin, of the Coast Guard have only been increasing.

How can the Coast Guard meet modern mission demands that are going up, I don't think anyone thinks that's not the case, despite having nearly 14,000 less major cutter operational hours available? Do you believe there's a gap between mission demands and what the new recapitalization program is focused on?

Admiral HAYCOCK. Thank you for the question. Our whole recapitalization program is all driven by the need to fill those gaps, the increasing demands in the Coast Guard with our 11 statutory missions. There are lots of demands on our people and our assets.

We find that the assets that we're procuring, you know, the national security cutters, fast response cutters and such, are typically more capable than what they're replacing and so we're finding that we're able to deploy for longer periods of time, that they have longer ranges, better speeds. The ships are more habitable for the crews, so it's less exhausting for the crews and such. The crews' operational tempo, they can maintain a higher operational tempo, things of that nature.

In particular, you know, to put some numbers out there, as you know, in Alaska, we are going to be putting some fast response cutters up there, replacing the aging 110s. So there are seven 110s up there. We're going to replace them with six fast response cutters and it may on the surface look like there's a mismatch there. Six doesn't equal seven.

As it turns out, the fast response cutters, we can actually deploy those for about 2,500 hours a year each. The 110-foot patrol boats can only do about 1,800 hours and so when you kind of look at just from a number of hours available, you know, six fast response cutters is about equal to about eight and a third 110-foot patrol boats, right, and we're also putting some 87s up there, as well. So even the numbers are going to be better.

Senator SULLIVAN. No, I'm very aware of that, and, you know, that was a letter from the former Commandant, Admiral Zukunft, to me on that capitalization program, which I think is a good beginning. I don't think it clearly answers the question.

I know that number of 14,000 less cutter operational hours available was actually from GAO. So I think it's just an issue we need to continue to look at because, as I've talked to the leadership in the Coast Guard about it, it's one thing to say we have a more capable platform, which I don't disagree with, but you also do lose something with less platforms. There's just so much in terms of the mission that you can do.

So we're going to continue to focus on that issue and, again, part of what we want to hear from you is if you think that gap needs

to be filled with additional recapitalization assets, then let us know because that's the whole point.

Right now, you have a very strong bipartisan approach to the recapitalization of the Coast Guard fleet. Very few people argue against that, given how old it is and given how important and increasing the mission of the Coast Guard is.

So if you think the gap needs to be filled with the readjustment of the recapitalization program, then, by all means, let us know.

Let me ask another question. It's really for you, Admiral, but also, Ms. Mak. You know, Senator Baldwin talked about shipbuilding in Wisconsin. There's actually, not to the extent of Wisconsin, but there's actually shipbuilding that goes on in Alaska in the Ketchikan Shipbuilding Yard and it's actually quite important.

You know, we had the new Commandant, Admiral Schultz, up in Alaska a couple times this summer and the ability to do maintenance, serious maintenance on some of these larger ships is clearly something that exists in Ketchikan for home-based ships.

I think the Coast Guard for reasons that relate to some of the rules around small shipbuilding or small business activities has looked at that shipyard in a way that doesn't make sense in terms of being able to utilize that.

I know you were up there this summer, Admiral, and I think, Ms. Mak, you were, as well. Can you give me a sense of how you're looking at major overhaul repair work being done to actually limit costs and make it more efficient for the fleet in Alaska to utilize that shipyard in Ketchikan?

Unfortunately, that shipyard just recently laid off a couple dozen people. So this is a really serious and immediate question that I know you were looking at this summer. I'd like to get your initial impressions.

Admiral HAYCOCK. We get this question fairly frequently, and the Federal Acquisition Regulations indicate that if there are two or more small businesses that can do the work, you have to set it aside, and I think there are some people who feel that that is optional, it's a guideline, but it's actually a regulation that we have to follow. So there are some things you can do.

Senator SULLIVAN. Right. But the whole point of that, and I'm going over my time here, so I apologize to my colleagues, but the whole point of that is to give small businesses, small communities, the ability to do that work. Ketchikan, the shipyard there is for a small community and, you know, we've had this discussion for a long time. The intent of that regulation seems to be flipped on its head when you're looking at the exact point of that regulation is to help small communities with shipbuilding capacity and yet because that shipyard is somehow connected to a bigger company several thousand miles away, you're penalizing a community that just lost several jobs in that shipyard. It makes no sense.

So I'll let you finish your answer, but I think the bureaucratic focus on these regs when we all know it's actually hurting the very people those regs are supposed to help is starting to become a real problem and I've had the Commandant give me his commitment to solving this and already we're losing jobs there, and it would be cost effective for the Coast Guard as opposed to sending ships all the way down to the Lower 48 to get retrofitted and maintenance

when you can do it right there in Alaska for the ships that are based in Alaska.

So please finish your answer but that's my view of it and I hope your answer aligns with my view.

Admiral HAYCOCK. And I understand your frustrations and concerns and we share those frustrations and concerns.

Senator SULLIVAN. So how do we solve it?

Admiral HAYCOCK. Maybe the answer is to amend the regulations to give us the flexibility to do that. That would be helpful.

We try to balance operational needs with costs and so as you pointed out, it costs money and it consumes time to take a cutter out of its general operating area near its home port and send it some place else for maintenance, but the regulations require us to set those things aside.

The area commanders look at these things and when it becomes clear that we need to seek a waiver to get around that, you know, like an operational or geographic restriction, we go through that process and we generally do that if there's a maintenance issue on the ship that prevents it from getting where it needs to go. If it is consuming far too many operational hours to transit to and from and it limits what we can do in theater, those are all things that are considered when we make those decisions.

Senator SULLIVAN. Well, I'm going to cut you off here, Admiral. I'm sorry.

Ms. Mak, I'll come back to you on this question, if that's OK, but I do think the area commanders that I've talked to, all of them agree with me on this, the Coast Guard District 17 commanders. But I'm sorry, I've gone way over my time.

Senator Baldwin.

Senator BALDWIN. No worries, no worries.

As I noted in my opening statement, Wisconsin is home to many experienced shipbuilders and suppliers. Some Wisconsin companies seem to be getting shut out of Coast Guard procurement.

By way of example, the Coast Guard operates more than 700 boats that have outboard motors. Only 91 of those 700 use U.S. motors, like those made in Wisconsin by Mercury Marine or Evinrude. In other words, 87 percent of Coast Guard's small watercraft use foreign-made outboard motors.

I introduced my Made in America Shipbuilding Act to address these unacceptable situations by expanding current Buy American laws to cover all Federal agencies, all classes of ships, and substantially more shipboard components, including outboard motors.

So, Admiral, do you believe that procuring more U.S.-manufactured shipboard components would strengthen the domestic industrial base and support U.S. national security?

Admiral HAYCOCK. So I'm proud to say that we comply with Buy American requirements currently and if the regulations change, we would be onboard and support that, as well. The challenges we have with the industrial base is, if we're not careful, we create an artificial demand signal that's not sustainable. You know, we want to go with American products and end user items in our inventory, but we feel like if you want to keep the costs reasonable and be good stewards of our resources, competition is the best way to do that and so, you know, we try to maximize competition.

The people that originally created the Buy American Act put in provisions to provide flexibility for ship designers and shipbuilders and other agencies, as well, you know, for other procurements and such, to give them such flexibility, because sometimes there are items that just aren't made in America. There's just not a demand signal for industry to respond to. In other cases, there are, but they're not competitive in pricing.

We don't typically tell the contractors what items must be U.S.-built. We follow the Buy American Shipbuilding Act, which gives them a little flexibility, and that allows them to be competitive with one another and come up with competitive pricing in proposals and so one proposal might offer certain ship items to be domestic and some foreign. Another one might be a little bit different, trying to distinguish themselves from one another.

And then we do an evaluation of that, based upon the evaluation criteria, like a best value or low cost sort of thing, and then the shipbuilder, the designer, goes through with the proposal as they've submitted it.

So we make sure that we have all the shipbuilding Buy American clauses from the FAR are in our contracts to support that and our program managers monitor that carefully to make sure that the shipbuilders are complying with that, as well, but there are times when we end up with foreign components in like some of our engines, like you've indicated, on the outboard engines and such, and typically for like small boats and such, once we do have a component, it doesn't make sense to just go out and change the things, you know, unless there's something broken and needs to be fixed.

So when we have to do wholesale changes, that's all done competitively, but until that happens, we typically, for keeping the costs for maintenance down because our maintenance dollars are precious and few, we typically stick with what we were provided until something forces us to go otherwise.

Senator BALDWIN. I'm going to dig a little deeper in this. So Coast Guard procurement contracts and subcontracts that are not bound by Buy American laws, such as acquisitions of outboard motors, diesel engines or auxiliary and deck equipment, can you give me or the Committee some examples of Coast Guard contracts with foreign companies?

Admiral HAYCOCK. For what I do in acquisitions, all of our ship designs and ship construction are done domestically. So our national security cutters built at Huntington-Ingalls, you know, the FRC's built down at Bollinger Shipyards, the OPC's are going to be done by Eastern Shipbuilding.

Senator BALDWIN. But I'm seeking—can you give me some examples of contracts that the Coast Guard has with foreign companies?

Admiral HAYCOCK. I don't have that. I didn't come prepared to provide that. I can get it for the record.

Senator BALDWIN. If you can do that and follow up, that would be great. This you may have to do also and follow up: How much taxpayer money does the Coast Guard spend on contracts with foreign companies annually, and if you want to just generally answer now and then follow up with specifics for the Committee, that would be great.

Admiral HAYCOCK. I would need to take that for the record, ma'am. I don't have that data with me.

Senator BALDWIN. OK. And then what proactive steps, if any, does the Coast Guard take to seek contracts with American manufacturers and small businesses in cases where the law does not require you to?

Admiral HAYCOCK. We are making a concerted effort over the last several years to communicate better with industry in general. So we try to do things like have industry days where we basically bring industry in and have conversations about what our current and future needs are to make it easier for them to identify opportunities to do business with the Coast Guard. So we've done a bunch of those as of late.

We've done some reverse industry days, as well, where they actually have the floor and help us to better understand how to do that sort of thing. So we're actively going after increased communications to help with that.

Senator SULLIVAN. Thank you. We're going to start with a second round of questioning here.

I think some of our colleagues are going to be coming back, but, Ms. Mak, do you have any views on the issues the Admiral and I were discussing as it relates to the potential opportunity and cost savings to be honest of the shipbuilding yard in Ketchikan as it relates to maintenance?

I don't know if you've looked at that issue, but it's an important one that can reduce costs and actually continue to create jobs in my state.

Ms. MAK. I have not looked at that issue, so I really am limited to what I can say, but I do agree that if it's in the regulation and that's what Coast Guard has to follow. They have to follow the Federal Acquisition Regulations.

Anything that defers from that would have to require an actual change in law and that would have to be——

Senator SULLIVAN. Or a change in regulation, right.

Ms. MAK. Right. Interpretation.

Senator SULLIVAN. Correct. Or a waiver.

Ms. MAK. Correct.

Senator SULLIVAN. Right. OK. Let me turn to an issue that I know all three of you have focused on and is really important to the country and, Mr. O'Rourke, your point is really important. We need to get it right.

So I'm just going to open this up. It deals with the polar security cutter and the acquisition timeline. You may have also seen, it's not just important for the Coast Guard but I think for the national security of the country with increasing strategic interests globally in the Arctic Region.

Secretary Mattis has talked about this, all the co-COMs have, and so in this year's NDAA signed by the President just a few months ago, there was a significant provision that I authored that has the authorization for six additional icebreakers, three polar class, three mediums.

So here's my question, and I'm just going to throw it out to all of you because I think a good discussion on this is important.

The initial schedule, which I think was a little bit kind of, you know, spit balled, was one icebreaker will take 10 years and a billion dollars to build, which, I mean, we put a man on the moon in less amount of time than that in terms of the time.

Where are we right now and how can we do this correctly but accelerate the acquisition schedule?

I'm going to throw something out that'll, you know, make the shipbuilders in America a little bit nervous, but, you know, if it's going to take seven to ten years, why shouldn't we just lease some icebreakers, polar class heavy icebreakers right now?

The Fins build them for $250 million a year. So I'd just like to open it up to all of you. Maybe, Mr. O'Rourke, we could start with you, but I really would like to hear, and if you're in disagreement with each other, please go ahead and say that. It's always good when we have panelists who have a little bit of different views. It actually helps us.

Mr. O'ROURKE. In terms of accelerating the timeline, the Coast Guard has been able to do that relative to schedules we were looking at a few years ago in a couple of ways.

One is by forming the Joint Integrated Program Office with the Navy and they are using——

Senator SULLIVAN. We all think that was a good move, so that's a good initiative by the Coast Guard.

Mr. O'ROURKE. Right. And the Navy is sharing their best practices with the Coast Guard and that has helped to take some time out of the timeline.

Second, the Coast Guard and the Navy have decided to use a parent design acquisition strategy. This is an icebreaker that will be derived from an existing icebreaker design and that shortens the design time. That ten-year schedule you mentioned earlier was roughly five years to design and roughly five years to then build the lead ship.

Senator SULLIVAN. So no one's saying ten years and a billion dollars for one ship anymore, I hope?

Mr. O'ROURKE. Not to my knowledge and a big part of the reason is that the design portion of that ten-year timeline has now been compressed in part by adopting the parent design strategy.

So these are two things that have brought the timeline shorter than what we were looking at earlier and, as I mentioned in my opening remarks, the estimated cost of this ship has come down, perhaps considerably, from that earlier $1 billion figure and that may be due in part to the tank testing that has been done by the Coast Guard in conjunction with the Canadians up at the Canadian Tow Tank that has allowed us to examine hull designs for that ship that can more efficiently break ice than the older hull designs from 40 years ago that can allow the engine and the propulsion plant to be smaller and the ship therefore to be smaller and less expensive. That's one reason, not the only one, why the estimated cost of the ship has come down.

Now that said, GAO has indicated that there's a risk of the lead ship being delivered late and I agree with that assessment.

The Navy's experience in building lead ships is that they often come in late and so my sense is that there's a risk of the lead ice-

breaker coming in late, perhaps as much as a year or more late, and that has a couple of implications.

One is that it could put some cost pressure on the ship. One of the reasons it might be late is that it's using more labor to build than what was originally projected.

The Navy and the Coast Guard can insulate the government against that risk by using a fixed price contract, which the Navy and the Coast Guard plan to do.

This can also have implications for what you do to bridge the time between the retirement of the *Polar Star* and that lead ship coming in and has implications for the amount of money you want to put into the *Polar Star* to extend its service life, for example, or to do a short-term bridging lease of a ship, which the Coast Guard has done in the past with some foreign icebreakers.

Last, however,——

Senator SULLIVAN. The Coast Guard has done that previously? I was unaware of that.

Mr. O'ROURKE. There have been three instances where the Coast Guard has done short-term leases of foreign icebreakers to bridge gaps in——

Senator SULLIVAN. How long is short-term?

Mr. O'ROURKE. This would have been on the order of maybe a year or two and one of them involved the Swedish ship and one or two of them actually involved Russian icebreakers.

Senator SULLIVAN. Well, we're not going with the Russian option.

Mr. O'ROURKE. Right.

Senator SULLIVAN. I think it's a disgrace that we have men and women who serve in the uniform of the United States of America deploying on a ship that's that old and they do a great job keeping it up to speed, but, holy cow, that ship is very, very, very old and I think it's almost becoming unseaworthy.

Mr. O'ROURKE. The foreign icebreakers may not always be available for lease and they have some other potential downsides, as well, but we have done that in the past as a bridging option.

But the one thing I will finish by saying is that if there is a chance of a late delivery on the lead ship, then that could become an argument for beginning construction of the lead ship as soon as you bring the design of that ship to a high level of completion and the ship is otherwise ready to begin construction.

If you think there's going to be a gap, why delay the start of the ship as long as the ship is ready to begin? That's the least you can do to minimize that gap in time that might result if, in spite of your own best efforts, the ship does wind up being late compared to its original schedule.

Senator SULLIVAN. Ms. Mak, you want to comment on the schedules and other issues related to the polar security?

Ms. MAK. Thank you. Regarding the foreign icebreakers, regarding that question, I would say that foreign icebreakers from friendly nations generally serve different functions, different missions, and they break ice that is different than the polar regions.

The national security cutter here is multi-missioned, non-nuclear, and has to traverse the globe on different climates year-round, both poles. We don't have—even foreign nations don't have a cutter of that type.

But it is also important to know with regards to schedule that the U.S. shipbuilding industry has not built an icebreaker of this magnitude in decades. So there's going to be a lot of significant requirements that are going to be needed and to be addressed.

When it comes to schedule, overall from an acquisition perspective, we've repeatedly found that compressed optimistic schedules is one of the main reasons why programs don't take this knowledge-based acquisition approach and they end up causing the program to cost more in the long run and that because you're doing a lot of concurrency and rework.

So in our report this past summer, we are encouraging the Coast Guard to take the time to do it right and to really focus on getting the knowledge base needed for design stability, technology, maturity, and address the schedule issues and put in reasonable times for schedules.

At this point, the current acquisition only has a buffer which is of 6 months between the target date of when they're supposed to deliver in September 2023 and then the baseline date of March 2024.

There are no schedule—there are other schedule risks that aren't involved which may or may not be within the Coast Guard's control. They have not planned time, you know, basic layout of piping, machinery, cabling, testing, bid protests, some of the things that are out of their control, delays on the contractor's side. All those need to be considered in their schedule as they build it.

Senator SULLIVAN. Thank you.

Admiral, and again, I apologize to my Ranking Member here. I think this is an important discussion that also relates to the Great Lakes, as well, the polar region.

Admiral HAYCOCK. I don't want to disappoint, but I don't have any major disagreements with my colleagues.

Senator SULLIVAN. What about short-term leasing?

Admiral HAYCOCK. So for short-term leasing, we have looked at this, I would say exhaustively. We did an analysis of alternatives which took quite a bit of time, it was pretty thorough, and looked across the globe at what sort of icebreakers were available to do the sort of missions that we need them to do, and we quickly netted it down to only two designs that would meet our needs.

One was a Soviet and the other one was a Canadian design that hasn't yet been built. For obvious reasons, we weren't going to go with the parent craft design from the Soviet Union or from Russia and so some of the designs that have been proffered, you know, likely will be using some of the Canadian design as kind of the basis of the design.

We've looked at Scandinavian designs and such and our mission is so different from theirs that their designs just simply won't work. There are some very unique things that we do, you know, here in the United States and in the Coast Guard in particular. You know, we need a polar security cutter that can transit from its home port in the United States all the way down to Antarctica to do a mission and come back. It has to be able to go all the way up into the Arctic and back.

You know, the Scandinavian countries don't go those distances typically, and not routinely like we do. So that requires some de-

sign tradeoffs in terms of, you know—a ship that breaks ice well is not one that handles well in heavy seas and so there's tradeoffs and things that need to be done, but we confirmed pretty quickly that there's nothing we can lease out there that will do the job.

Now the National Science Foundation has leased some foreign icebreakers for the McMurdo Breakout in the past and I think they've had mixed results with that. Sometimes they're available, sometimes they're not, but to do Coast Guard missions, to be able to be present in the Arctic to do a massive search and rescue mission for the cruise liners and along those lines, the polar security cutter is our best bet, sir, and that's why we're putting such an emphasis on it and it's why we're moving, you know, hard and fast on that.

I concur with Ms. Mak. There are risks there. The schedule is tight, without a doubt, but we need this now and so we have to move fast to make it happen.

You know, we concur with the recommendations that GAO made and we're thankful that they looked at the program and made their recommendations. We're moving out to address those things, but the need for the polar security cutter is now, and I think the Commandant has indicated we need six polar cutters. Three of them need to be heavy and we need one now and we've enjoyed tremendous support from Congress on this and we're hoping that we'll continue to get that support, sir, because any stall will have schedule and cost implications.

But, more importantly, any hesitancy on the part of resource in this sends a signal to industry, the industrial base, and sends mixed signals on whether we're serious about it or not. We need them engaged and we need them being innovative to come up with a solution that will work for us.

Senator SULLIVAN. Thank you.

Senator Baldwin.

Senator BALDWIN. I continue on the icebreaking theme for a moment here.

Admiral, I've spoken in this Committee many times about the importance of icebreaking operations on the Great Lakes and my position that the economic data and operational reports from the field in recent winters show that the Coast Guard doesn't have enough assets to effectively meet its icebreaking mission.

Most recently, I raised that at the Commandant's April Nomination Hearing.

It's why I have fought to include $5 million in additional funding above the Coast Guard's budget requests in Fiscal Year 2017 and 2018 for the survey and design of a Great Lakes icebreaker that is at least as capable as the *Mackinaw.*

In the Senate version of the Fiscal Year 2019 Homeland Security Funding Bill, I've helped secure another $5 million.

In April, the Coast Guard reported that it was using the funding to develop operational requirements, evaluate current icebreaking capability and to survey and analyze the *Mackinaw* to inform a future design.

It's almost 6 months later and I still believe that the Coast Guard is moving too slowly on this important program.

So I'm wondering if you can provide me with a brief update right now and then commit to briefing my staff in much more detail in the coming weeks?

Admiral HAYCOCK. So, first, let me thank you for your support and also, you know, concur if you would like us to come and brief you in detail, we'd be happy to do so.

As an acquirer, I work based upon requirements and so I rely on the operation of the Commander to tell me what his needs are and then I find the best way of meeting those needs and so I believe our operation community is identifying what are the specific requirements that we need for the next generation of Great Lakes icebreaker.

While we're doing that, we are putting money into revitalizing our current icebreaking fleet up there, a 140-foot fleet, and so nine of those cutters are going through a service life extension to make sure there are no gaps in service up there.

So the Coast Guard is doing that work and we're about two-thirds done with that program and we'll be wrapping that up in the next couple years. Those cutters will have new life breathed in them and they'll continue to do the mission and meet our needs up there.

It's like anything. We have to balance. As stewards of the funds that you give us, we need disciplined approaches to these things and so the work we're doing on the requirements is part of that disciplined approach and if I don't take the disciplined approach, then GAO will note that, right, because their job is to hold us accountable and identify those things that we're doing that are overly risky and such.

So we need to make sure we do the due diligence and understand what their requirements are. Otherwise, we'll end up possibly with the wrong asset and they'll be over-budget or costs, that sort of thing. So we want to make sure that we do the right thing up front to deliver what the capability is that's needed up there.

Senator BALDWIN. Back to the Made in America Shipbuilding Act, it would not only help strengthen our national security but I think it also makes a strong economic argument for government by lowering life cycle costs.

When ships need repairs or new parts, American-made parts are easier and cheaper to acquire and the repairs tend to take less time.

Admiral, have you experienced increased life cycle costs because of foreign-made components or had difficulty repairing or finding replacements for them?

Admiral HAYCOCK. I can give you some anecdotal information. I can tell you that on our inland fleet, some of the cutters that ply our inland waters, you know, the Ohio, the Mississippi, the Missouri, that sort of thing, some of those have some foreign-made engines that come from Italy, and we're finding that it is very difficult to support those. Again getting the parts, getting them in a reasonable time-frame, is challenging and so those challenge our ability to stretch our maintenance dollars to get all of our needs met and keep our fleets operational.

So there are definitely consequences that come with having foreign-made components in user items.

Senator BALDWIN. And I want to just ask, Mr. O'Rourke and Ms. Mak, has GAO or CRS studied how using U.S.-made shipboard components impact the cost and feasibility of maintenance and sustainment of such equipment over the life cycle of the vessel?

Mr. O'ROURKE. The CRS has not looked at that.

Senator BALDWIN. OK.

Ms. MAK. The GAO has also not looked at that.

Senator BALDWIN. All right. So, Ms. Mak, I would like to get the GAO to study this issue and I will certainly follow up with a formal request to do so.

Ms. MAK. Sure. Absolutely.

Senator SULLIVAN. Well, I'm pleased to have Senator Wicker here, who's the sea power subcommittee of the Armed Services Committee and being Mississippi's Senator knows also a little bit about shipbuilding.

Senator Wicker.

STATEMENT OF HON. ROGER F. WICKER,
U.S. SENATOR FROM MISSISSIPPI

Senator WICKER. I'm a proud member of this Subcommittee, too, Mr. Chairman.

Admiral Haycock, let's talk a little. I've been over in a classified briefing with Defense Department people, so that's the reason I missed a bit of this hearing.

Let's talk about national security cutters. We make them at Huntington-Ingalls in Pascagoula, Mississippi, and last Wednesday, we saw the Coast Guard Cutter *Stratton* offloading more than 22,000 pounds of cocaine seized in less than a month in the Eastern Pacific.

Congress is faced with a decision to fully or partially fund the acquisition of a 12th national security cutter in Fiscal Year 2019. This 12th NSC would complete a one-for-one replacement of the 12 Hamilton Class cutters.

Why is that important, and can you discuss the impact that these national security cutters have on the Coast Guard's efforts to carry out its core missions?

Admiral HAYCOCK. Thank you, sir. The national security cutter is a tremendous asset and I think we are finding that as each day goes by and we deploy these things, we're learning more and more things about what they can do.

I was the commanding officer of a high-endurance cutter, one of the ones that was replaced by a national security cutter, and I'm shocked and proud to know that, you know, national security cutters are typically pulling in more drugs, you know, pulling drugs off the water in one deployment than I was able to do during two years onboard my high-endurance cutter. They're having a profound impact in curbing trans-national crime in the way of counter-drug mission.

Our goal, and I don't think this is a surprise, we're trying to push the borders as far as we can, you know, our enforcement borders as far as we can from our physical borders, right, and so, you know, getting those cutters on scene and trying to intercept that stuff well before it gets to our shores is a priority for us and those cutters have been doing a fantastic job with it.

Senator WICKER. OK. Let's talk about the polar security cutter fleet.

There's a difference in the Senate Homeland Security Appropriations Bill which funds $750 million for the polar security cutter recapitalization. The House does not have any money in there for that.

So what are the stakes of the House prevailing and not having money in there versus the Senate figure of $750 million being approved?

Admiral HAYCOCK. Before you got here, I talked a little bit about the support we've gotten from Congress on the polar security cutter program. It has been phenomenal and it has allowed us to make much progress.

We are closer to recapitalizing the icebreaker fleet than we have been in 40 years and so we are on the cusp of getting there.

The funding that are in the bills is of vital importance for us to make progress in that area and I've got two concerns.

One is if we don't get it, it's going to definitely have schedule impacts. We can get some stuff on contract, like the detail design, but things like long lead materials and stuff we'll be challenged to get which will impact our ability to deliver on time.

The other piece of it is the support that we've gotten from Congress over the years has put excitement in industry in, you know, building the ship and learning more and getting lessons learned from it and applying to other shipbuilding programs.

If we don't get the funding we need, that sends a signal to the industrial base that the nation isn't serious about the polar security cutter and the need for the polar security cutter is greater now than it has ever been.

Senator Sullivan had talked a little bit earlier today about the shape the *Polar Star* is in and we're going to put some money into *Polar Star* to extend its service life so we can get a polar security cutter, you know, in theater, but if we want to have year-round access to the polar regions for national security, national sovereignty, and search and rescue, and the other missions the Coast Guard does, we need to keep making progress on that, sir, and the $750 million will send a clear signal to the industrial base and the Nation at large that we're serious about getting polar security cutters.

Senator WICKER. Thank you very much. I move we adjourn.

[Laughter.]

Senator SULLIVAN. Well, I actually support Senator Wicker's focus on another national security cutter. Those are credible platforms and I had the honor of being at the commissioning of the *Douglas Monroe* out in Seattle and it was really impressive.

Senator Blumenthal.

STATEMENT OF HON. RICHARD BLUMENTHAL, U.S. SENATOR FROM CONNECTICUT

Senator BLUMENTHAL. Thank you very much, Mr. Chairman.

I want to focus on the importation of opioids, synthetic opioids particularly, but drugs in general, and what kinds of additional resources the Coast Guard would need to combat the flow of opioids into this country?

Admiral HAYCOCK. So the operational aspect of the counter-drug mission is a little outside of my lanes as an acquisition officer.

I can tell you that we have a program of record that we've established for the polar security cutter, the national security cutter, the fast response cutter, and the offshore patrol cutter, which are all key elements of curbing transnational crime and the importation of narcotics and such into our country.

We believe that the program of record that we've put out there is sufficient to do what we need to do. Now there are some areas where we could improve in ways of unmanned assets, in particular aerial assets, and so we've done some work in that regard.

We've actually deployed an unmanned air vehicle on Coast Guard Cutter *Stratton* for several years now as an effort to kind of learn what sort of capabilities it can bring to the fight and better understand what sort of training and policy and procedure we would need to actually execute it and to run it efficiently and effectively and that, the SUAS, the small unmanned aerial vehicle we've been using, has contributed to countless drug interdictions in theater and the ships absolutely love it, and so we are making great progress on putting that capability on the national security cutters.

I think it's something that we might want to think about for follow-on is, you know, do we deploy it on the offshore patrol cutters? Do we deploy it on FRCs?

We're also working with CBP on land-based UAS. So we're part of a joint program office with that out in Southwest Border. So we have Coast Guard folks that are part of that team, some of them that are pilots and some of them are planners, that sort of thing. So we're getting great lessons learned from that effort with CBP to determine what our resources might need to be and what sort of requirements a land-based UAS can provide for the Coast Guard in the fight against drugs.

Senator BLUMENTHAL. Well, I realize that it may not be directly in your area of expertise, but it certainly should be involved in our recapitalization criteria because the Coast Guard is on the front line of our war against illicit drug trafficking and I've seen in my visits around the country the resources that are deployed.

So I would somewhat take issue with the contention that the resources are adequate now because in this war, we're losing. We're losing the war against the illicit importation of drugs and it's not only across the borders, our southern borders, it's also by sea, and I think that area of combat is too often lost on the American public as well as on public officials.

I want to ask you about the Coast Guard Museum in New London. I am assuming that you can state unequivocally that the Coast Guard maintains its unambiguous commitment and 100 percent dedication to assuring that that Coast Guard Museum is built in New London.

Admiral HAYCOCK. I can, sir. We are excited about that. The Coast Guard has a great story to tell and it's unfortunate that not more people know it and so the museum will go a long way toward helping the general public understand our missions and our contributions to our nation and so we work closely with the National

Coast Guard Museum Association and, you know, we're excited about that coming online.

Senator BLUMENTHAL. And, finally, in the minute I have left, I want to highlight another issue, which is admissions to the Coast Guard Academy.

There have been very significant complaints, based on data, about potential discrimination in the admissions policies to the Coast Guard. I think it's an area that deserves attention at the highest levels. I've communicated my concern to the leadership of the Coast Guard and I hope that you can commit that there will be a thorough review and examination of the admissions policies so as to assure the public that there is no discriminatory practice whatsoever in admissions or in the policies and practices of the Coast Guard Academy generally?

Admiral HAYCOCK. I can say unequivocally, sir, that this has the attention of the highest levels of the Coast Guard without a doubt.

Senator BLUMENTHAL. Thank you. Thank you, Mr. Chairman.

Senator BALDWIN. Thank you, Senator Blumenthal.

I want to, Admiral Haycock, talk about language that was inserted in the Fiscal Year 2018 Omnibus. They have an explanatory statement that says, "The Coast Guard, to the maximum extent practicable, is directed to utilize components when contracting for new vessels, U.S.-manufactured components. Such components include auxiliary equipment, such as pumps for shipboard services, and propulsion equipment, including engines, reduction gears, and propellers."

While this language doesn't go as far as the legislation I've been describing, the Made in America Shipbuilding Act that I authored, I'd like to know how the Coast Guard is applying this congressional direction to the acquisitions of the heavy polar icebreakers and the inland waterways tenders, and I will preface this with saying, you know, I understand that the Coast Guard complies with all current laws and regulations, but this expression of congressional intent is calling for the application of Buy America provisions above the bare minimum of following the law.

So can you tell me a little bit about how you're applying that language in the Fiscal Year 2018 Omnibus?

Admiral HAYCOCK. We appreciate your support on that and probably the best way to address this is if I were to come and brief you and we could come and give you the facts and figures and things you need.

When we try to comply with the Buy American Act, we're not using it as a shield. We want to buy American and I think the question that I was raised earlier was, you know, what are the life cycle costs associated with that sort of thing.

There has been no studies on that, as you've already found, and I think such a study would be very helpful because it will help us to make wiser decisions in the future. Oftentimes, when the shipbuilders or the designers or other companies doing other work, when they pick foreign components, sometimes, as I indicated earlier, it's because that sort of industrial base doesn't exist.

For example, on the Polar Class and on the polar security cutter, I'm not aware of any manufacturers in the U.S. that make a propulsion pod of the size and strength necessary for a polar security

cutter, but they are made over in the Scandinavian countries where they routinely use that sort of technology for their icebreakers and so if we try to force something like that to be a buy American, it can be done but it would add a considerable amount of time and probably cost to the vessel because the industrial base would have to spool up to do that sort of thing. It would be a lot of R&D. There will be a lot of initial entry costs into that market and then the question that we have to ask ourselves is, is that demand sustainable?

Once all the polar security cutters are built, is there going to be a sustainable demand for pods, for example, in the United States, and I can't answer that question. I think a study might be helpful to do that.

But those are the sorts of challenges that we run into, and then the other piece is the cost basis, and it would be helpful to have a study that would help us to kind of figure out if we decrease the acquisition cost up front but we increase the life cycle costs, is that a good trade because the life cycle costs are about 70 percent of the cost of an asset in its lifetime.

So we are constantly looking for ways to reduce life cycle costs and we've done things like put some of our sustainers in key leadership positions to ensure that those sorts of issues are looked at as we go through the acquisition process.

Senator BALDWIN. One, I think, final question for me. Admiral, can you provide an update on the acquisition timeline for the inland waterways and Western River tenders? Specifically, when does the Coast Guard plan to issue an RFP, and will the Coast Guard consider using off-the-shelf designs from experienced shipbuilders in order to save time and money?

Admiral HAYCOCK. So we are open to using parent craft designs and such. We're just starting an analysis of alternatives and that's a disciplined part of the process. We have to go out and look and see what exists out in the world, you know, in terms of designs and ships that have already been built and the components and such and so we'll do this assessment and that'll kind of do market research and kind of survey what's available out there.

One of the challenges we have right now is the Coast Guard missions are different than a lot of the commercial companies out there, right. So I think you'll find that a lot of the boats and the pushers and such that are plying the rivers have a very small crew, maybe a crew of five, right, and they're not required to travel incredibly long distances between stops for fuel and supplies and such.

For our ships, to do our missions, because our folks typically will get off the ship and they'll be clearing brush from aids to navigation that prevent people from seeing them, they're repairing aids to navigation in some dangerous places with snakes and other vermin and stuff. So to do those sorts of missions, that are vastly different from the commercial world, requires a very diverse crew and—alongside the same lines—if we want to increase diversity in the literal term in our service, we need to make sure that those assets are capable of having women in the crew and the current assets don't have that capability.

And so that's a little bit unique from what we see when you look at how many people we need to put on the ship and to be able to have mixed gender berthing. That offers some interesting design considerations.

So that will all be looked at as part of the analysis of alternatives. It's going to be probably nine months or so before we can get all that work done and figure out exactly what that means, but we're definitely open to looking at commercially available designs and seeing if those can be modified inexpensively.

We've already reached out to the Army Corps of Engineers to do some initial kind of concept work up in Philadelphia and they've provided a number of options to look at, which include monohulls, which means it's a single ship that does everything, or using maybe a pusher and a barge, kind of like the way we do the mission now.

So those are all things we're looking at. It's going to be probably a year or so. I don't have it memorized, but it will probably be a year before we start, you know, looking at moving forward with the actual acquisition, formal acquisition of it.

Our goal is to get something—get the ships into service in the early 2023 timeframe, I think, and the approach we're taking is actually fairly accelerated when you compare it to some of the other acquisitions we've done in the past.

I know that the country recognized the need for those things and so we're moving as fast as we can to make that happen. Does that answer your question?

Senator BALDWIN. It does. Thank you.

So seeing no other Senators at this moment, I will announce that the hearing record will remain open for two weeks. During this time, Senators may submit questions for the record. Upon receipt, the witnesses are requested to submit their written answers to the Committee as soon as possible.

I want to thank the witnesses for appearing today.

This hearing is now adjourned.

[Whereupon, at 10:52 a.m., the hearing was adjourned.]

A P P E N D I X

PREPARED STATEMENT OF REAR ADMIRAL MICHAEL J. SILAH, NOAA DIRECTOR, OFFICE OF MARINE AND AVIATION OPERATIONS AND DIRECTOR, NOAA COMMISSIONED OFFICER CORPS, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE

Introduction

Good morning Chairman Sullivan, Ranking Member Baldwin, and Members of the Subcommittee. My name is Rear Admiral Michael Silah, and I am the Director of the Office of Marine and Aviation Operations (OMAO) and Director of the NOAA Commissioned Corps at the National Oceanic and Atmospheric Administration (NOAA), within the Department of Commerce. Thank you for inviting me to testify today on our work providing environmental intelligence gathering platforms for the Nation. NOAA appreciates the opportunity to participate today along with our colleagues from the U.S. Coast Guard, Government Accountability Office, and Congressional Research Service.

For over two hundred years, NOAA and its predecessor organizations have provided foundational data, products, and services to support safe, efficient maritime commerce. Each day, nearly every American relies on the data, products, and services NOAA provides. These products and services include daily weather forecasts, navigational tools to support the country's nearly $4.6 trillion in economic activity generated by U.S. seaports, and assessments of the health of the Nation's fisheries. Through our network of observations, models, forecasts, and assessments, we put environmental information into the hands of people who need it. Over the years, NOAA has made significant investments to ensure the agency can leverage new technologies to provide the best products and services possible. However, challenges to the agency's observational infrastructure still exist, especially for our aging research and survey ships.

Current Status

Currently, NOAA's fleet includes 16 research and survey ships. Every year, NOAA's ships conduct more than 100 missions for collection of data critical for nautical charts, fishery quotas, exploration of America's 4.3 million square mile Exclusive Economic Zone, storm surge modeling, and weather forecasting. NOAA's line offices, other U.S. government agencies, communities, and businesses around the Nation rely on these data to keep U.S. ports open to maritime commerce, understand changes to the planet, monitor the health of fish stocks, and plan for severe storm events.

The age of NOAA ships represents a continued and pressing concern. NOAA's aging vessels are increasingly unreliable and expensive to maintain. At the conclusion of Quarter 3 FY 2018, unscheduled maintenance on the NOAA fleet had cost $13.5 million and caused more than 425 lost operational days at sea. By the end of 2018, half of the NOAA ships in the NOAA fleet will have exceeded their design service life. Escalating unbudgeted costs and lost days at sea will undermine NOAA's ability to meet its missions, and could have the following impacts: significant degradation of mapping capabilities on the West Coast and in the United States Arctic, including the Pacific Ocean, Bering Sea, and Arctic Ocean; a substantial loss of hydrographic survey capability on the East Coast and the Caribbean; and a reduced ability to conduct fishery and marine mammal stock assessments, monument and sanctuary stewardship in the Central, Southern, and Western Pacific, and trawl-based stock assessments in the Gulf of Mexico.

The NOAA Fleet Plan

The *NOAA Fleet Plan* assesses NOAA's current and projected at-sea observational infrastructure needs in carrying out its mission of protecting lives and property. It evaluates the status of the fleet and the current and future capabilities required to meet NOAA's public safety, economic, and stewardship missions, and sets a plan of action. NOAA treats the *Fleet Plan* as a living document whose execution incor-

porates new information that impacts acquisition strategies and/or priorities. At a minimum, NOAA plans to reevaluate and revise the plan every five years.

To help formulate the plan, NOAA performed an internal assessment in 2012–2013 to refresh NOAA's mission requirements. The assessment determined that a different mix of ships and a push toward new observational technologies are needed to better fulfill NOAA's mission requirements.

In January 2016, NOAA established an Independent Review Team (IRT) of senior-level scientific and industry experts to assess recapitalization planning for the NOAA fleet, recommend measures required to address identified deficiencies, and identify ways to overcome organizational impediments. The IRT is now a Standing Review Board for OMAO and continues to advise NOAA on its fleet recapitalization efforts.

Towards this same objective, NOAA established an internal team of experts from across NOAA in May of 2016 to assess the NOAA fleet's current composition and capabilities, long-term recapitalization planning, utilization of alternatives to the NOAA fleet (commercial contracting, Academic Research fleet, other public-funded vessels), current operational systems (crewing, scheduling), current maintenance practices, technology readiness and infusion (instrumentation and mechanical), and risk identification and planning. The efforts of this team produced the *NOAA Fleet Plan,* which outlined a comprehensive solution for long-term recapitalization of the NOAA fleet. The *NOAA Fleet Plan* was approved and published for distribution on October 31, 2016.

The *NOAA Fleet Plan* calls for the acquisition of new ships and at-sea data collection capabilities. NOAA's ships need to be adaptable and extensible to provide the infrastructure and capabilities necessary to meet mission requirements now and in the future. In contrast to the wide variety of vessel types that currently comprise the NOAA fleet, the future NOAA fleet will reduce the overall vessel types and focus on a core mission with secondary missions that make the best use of the vessels' capabilities. NOAA will leverage aspects of previous designs to the extent possible to meet multiple core mission requirements. Standardization is critical for efficient maintenance, sparing, upgrades and optimal crewing models. Each vessel type will incorporate the latest commercial technologies and will be able to accommodate new technologies as they become available. Across the fleet, core equipment types will be standardized as much as possible to reduce operation and maintenance costs as well as help to establish an effective reserve of spares to minimize ship down time. The final decision on ship retirements will be based on the material condition of the ships in concert with the alignment of mission capabilities of the ship and the fleet.

There are distinct considerations to evaluate in order to execute the recapitalization strategy. Efforts will be made throughout the process to leverage proven and existing design features from previous ship classes. This will not only help to create mission system standardization to meet multiple core mission requirements but also will help improve sparing and logistic support across the fleet. A stable budget profile is required for the sequencing of ship acquisitions and is critical to effective planning. Congress has appropriated approximately $75 million annually since 2016, providing continuity and stability in fleet planning and acquisition.

First, NOAA continues to proceed with the design and construction of two new NOAA general purpose oceanographic Class A vessels. These vessels will have primary capabilities to conduct oceanographic monitoring, research, and modeling activities and secondary capabilities for assessment and management of living marine resources and for charting and surveying activities. By utilizing the existing Navy Auxiliary General Oceanographic Research (AGOR) 27 specifications and adapting them to meet NOAA-specific requirements, NOAA will minimize the impact of lost fleet capacity and capability while leveraging government resources, saving years of time and millions of dollars. NOAA has entered into an agreement with the U.S. Navy to utilize their ship acquisition expertise in support of this effort.

Second, NOAA continues to conduct a requirements analysis and will proceed with concept designs for at least two Class B vessels. This class will have a primary capability to perform charting and surveying activities, with secondary capabilities for assessment and management of living marine resources and oceanographic monitoring, research, and modeling activities. Based on the extensive timeline needed for new construction acquisitions, it is critical to initiate the ship design and acquisition process as soon as possible.

Third, NOAA continues its requirements analysis and will proceed with concept designs of at least two multipurpose, low-endurance, shallow-draft, trawl-capable stock assessment Class C vessels. These specialized vessels will meet specific assessment and management of living marine resource requirements in coastal waters and the Gulf of Mexico.

Fourth, NOAA will proceed with initial requirements analysis and concept designs for the Class D vessels. These vessels would support the primary mission of assessment and management of living marine resources (trawl capable) with capabilities for secondary missions of charting and surveying, and oceanographic monitoring, research, and modeling.

Future Fleet and Vessel Procurement Status

The acquisition process is underway for the first two Class A ships. The NOAA AGOR Variant (NAV) is a 240-foot ship designed to commercial standards and capable of oceanographic science and data collection in coastal and deep ocean areas.

The NAV A vessels are being procured through an Interagency Agreement with the U.S. Navy as an assisted acquisition. The Program is currently conducting the Source Selection activities to support contract execution.

The vessels are expected to come on-line as existing assets are retired; minimizing or eliminating fleet capacity gaps is critical for data collection that feeds weather forecasts and fishery quotas, protects marine monuments, and maps our Nation's Exclusive Economic Zone.

It is for these same reasons that NOAA has initiated early design and acquisition planning activities for Class B and C vessels. To the greatest extent practicable, we will seek to leverage common hull, machinery, and/or mission systems to gain economies during the acquisition process as well as to reduce life cycle and fleet management costs.

Partnerships

NOAA has decommissioned more ships in the last ten years than it has introduced. Since 2008, the NOAA fleet has decreased from 21 to 16 operational ships. There are capacity gaps and, therefore, requirements that could not be met by the NOAA fleet. To the extent possible, NOAA has implemented mitigation strategies to minimize the requirements gaps, including: increased maintenance, increased use of charters, changes to ships working grounds, "piggyback projects", and introduction of new technology. Mitigation strategies are limited regionally, by capability requirements and availability, and by project requirements. Thus, these mitigations are largely maximized in current fleet operations.

NOAA continues to coordinate with its maritime partners to maximize days at sea productivity by assessing and incorporating government and commercially-driven technologies such as unmanned, autonomous, and remotely operated systems, as well as data analytics. These operational assessments have included unmanned operations from the Arctic to Antarctic as well as across NOAA's mission sets. Having a multi-mission, inter-operable, and coordinated Federal oceanographic fleet with groundbreaking technologies will improve operational capacity at the Federal level. NOAA is currently assessing the efficiency and effectiveness of meeting requirements through unmanned systems. We will use the results of this analysis to develop a comprehensive NOAA-wide plan that ensures it is using unmanned systems in a way that supports NOAA requirements in the most cost-effective manner.

Other Opportunities

The future NOAA fleet must be adaptable and extensible to provide the infrastructure and capabilities to evolve with future changes in technology and mission requirements. While it is impossible to predict all future advances in technology or changes in requirements, new ships must provide capabilities to allow for and support efficient operations, evolving requirements, and increasingly sophisticated technology.

Unmanned airborne and marine vehicles are enhancing ocean science at NOAA and extending the data collection capacity of the NOAA fleet. This includes autonomous underwater vehicles, tethered remotely operated vehicles, unmanned surface vehicles powered by wind, sun, and waves, and portable aerial systems launched from NOAA ships. In Fiscal Year 2018, NOAA invested $2 million to accelerate autonomous hydrographic mapping and autonomous sampling of ocean conditions towards operational maturity. NOAA is also incorporating unmanned systems requirements into the new ship designs. Future vessels will be able to operate multiple unmanned systems in tandem with on-board technologies, significantly expanding mission capacity and potentially reducing the cost per unit effort of these observations.

Every effort is being made to follow the process outlined in the *NOAA Fleet Plan* while taking advantage of arising opportunities that may facilitate the process. Based on the near term and pressing need to bring new ships online, NOAA is investigating the possibility of acquiring vessels from Federal partners. NOAA is committed to an open and competitive process to carry out conversions, repairs, and new builds. The Miller Act waiver provided in the recently enacted John S. McCain Na-

tional Defense Authorization Act for 2019 will also provide much needed flexibility and open up more shipyards to work on the NOAA fleet.

Conclusion

NOAA plays a unique and important role in providing critical informational infrastructure to support safe, reliable, and efficient marine navigation and environmental intelligence gathering across the planet. Partnerships are integral to achieving success in this ever-evolving and challenging environment. There is more work to be done to facilitate ship acquisitions but NOAA is working to develop and apply new technologies and collect data in innovative ways to improve our products and services.

NOAA will continue to properly, efficiently, and effectively acquire new vessels while mitigating the challenges of an aging fleet and maintaining an inherently governmental capability to conduct NOAA critical missions.

Thank you again for the opportunity to testify today. I appreciate the Subcommittee's time and attention and look forward to answering your questions.

OCEANA
October 10, 2018

Via e-mail

Hon. Senator Thune,
Chairman, Senate Committee on Commerce, Science, and Transportation,
Washington, DC.

Hon. Senator Nelson,
Ranking Member, Senate Committee on Commerce, Science, and Transportation,
Washington, DC.

Hon. Senator Sullivan,
Chairman, Senate Commerce Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard,
Washington, DC.

Hon. Senator Baldwin,
Ranking Member, Senate Commerce Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard,
Washington, DC.

Dear Chairman Thune, Ranking Member Nelson, Chairman Sullivan, and Ranking Member Baldwin:

Oceana, the largest international ocean conservation organization solely focused on protecting the world's oceans, strongly supports robust fleet recapitalization of the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Coast Guard. Oceana and its more than 725,000 members and supporters in the United States are committed to supporting the mission and functions of NOAA and the Coast Guard, both of which provide critical ocean research, stewardship and enforcement functions in the United States.

NOAA currently maintains and operates a fleet of 16 ships, which are used to perform key at-sea missions including charting and surveying, oceanographic research and monitoring, and living marine resource assessments. Within NOAA, the National Marine Fisheries Service (NMFS) uses many of these ships for its fisheries management efforts, including research and stock assessments, monitoring, and enforcement. Maintaining sufficient at-sea capacity is essential for NMFS' ability to sustainably manage U.S. fish stocks.

NOAA's October 2016 Final Report of the Independent Review Team on NOAA Fleet Recapitalization reports that by 2028, eight of NOAA's 16 ships will reach the end of their extended service life, rendering them inoperable. By 2030, two more ships will reach the end of their extended service life. NOAA has stated that all at-sea missions will be negatively impacted when these ships begin to come offline. The agency additionally acknowledges a six-to-eight-year timeline required for obtaining funding and for designing, building, and commissioning new ships. In other words, without concerted and immediate efforts to recapitalize the NOAA fleet, the agency will experience a crippling lapse in its ability to carry out mission-critical functions related to weather and climate predictions, fisheries research and management, and other key efforts within the next decade.

The Coast Guard is similarly focused on recapitalization and has embarked on a multi-decade process to recapitalize aging ships and aircraft. While the Coast Guard is currently procuring several new fleet assets, the Government Accountability Office (GAO) has identified maintenance, equipment, and funding issues that could

undermine the Coast Guard's key capabilities related to maritime safety, security, and environmental stewardship.[1]

For these reasons, Oceana applauds today's subcommittee hearing titled "The Future of the Fleets: Coast Guard and NOAA Ship Recapitalization" to examine the critical need for Coast Guard and NOAA fleet recapitalization.

Thank you for your attention to these critical fleet infrastructure issues.

Sincerely,

JACQUELINE SAVITZ,
Chief Policy Officer, North America.

OCEAN CONSERVANCY
Washington, DC, October 11, 2018

Hon. DAN SULLIVAN,
Chair,
Subcommittee on Oceans, Atmosphere, Fisheries, and the Coast Guard,
U.S. Senate,
Washington, DC.

Hon. TAMMY BALDWIN,
Ranking Member,
Subcommittee on Oceans, Atmosphere, Fisheries, and the Coast Guard,
U.S. Senate,
Washington, DC.

Dear Chairman Sullivan and Ranking Member Baldwin:

We are writing to express our support for the recapitalization of the maritime fleets at our Nation's premier ocean agencies: the National Oceanic and Atmospheric Administration (NOAA) and the United States Coast Guard.

People across the Nation rely on the vital services that are delivered by the fleet of ships and aircraft operated by both NOAA and the Coast Guard. NOAA's fleet of ships and aircraft are critical infrastructure for data collection in support of the U.S. economy in sectors including fisheries economics, emergency management, navigational support and more. The Coast Guard's fleet of vessels is essential for national security, marine domain awareness and patrolling our oceans and ensuring safety at sea.

NOAA fleet

Since 2008, the NOAA fleet has decreased from 21 ships to 16 currently operational ships. Without recapitalization, the NOAA fleet will be reduced to half its current size by 2028. Of the 16 ships that comprise the NOAA fleet, most are outdated. Three of the 16 vessels have been in service for more than 40 years and eight of the 16 vessels have exceeded their designed service life as of this year.

By 2028, the projected loss of eight ships to the NOAA fleet would "significantly undermine NOAA's ability to meet its mission, resulting in the total absence of mapping capabilities on the West Coast and in the United States Arctic, specifically in the Pacific Ocean, Bering Sea and Arctic Ocean; a 75 percent loss of its hydrographic survey capability on the East Coast and in the Caribbean; and the inability to conduct fishery and marine mammal stock assessments, monument and sanctuary stewardship in the Central, Southern, and Western Pacific, and trawl-based stock assessments in the Gulf of Mexico." [1]

Unlike other Federal and academic agencies whose primary mission is research, the data NOAA collects feed directly into operational products like navigational charts, storm surge models, weather forecasts, or fishery models to support regional catch allocations. NOAA ships are vital to our commercial fisheries. Annual NOAA surveys form the basis for our fisheries management system and without an adequate number of operational ships, surveys cannot be conducted, negatively impacting commercial fisheries worth billions of dollars.

In addition to maintaining current fleet levels to avoid these negative results, NOAA needs to expand beyond the current 16 vessels to properly address the changing world in which we live. Climate change, for example, exemplifies the need for NOAA to increase its fleet size:

- As climate change influences our shipping routes at unprecedented rates in the Arctic, more charting is needed in the region to ensure safe navigation and other safety needs for the expanding industry.
- Climate change is also impacting both our commercial and recreational fisheries. The NOAA fleets provide the best available scientific information and data so that fishery managers may make critical decisions to support fisheries,

[1] *https://www.gao.gov/assets/690/685082.pdf*
[1] *https://www.legislative.noaa.gov/policybriefs/NOAA%20Fleet%20Plan%20103116.pdf*

ecosystems and local economies. A robust modern fleet is needed to help managers and fishing communities be prepared for and respond to changes in the ocean.

- As climate change continues to bring about more severe coastal storms, we will increasingly need rapid response efforts to chart the changing underwater landscape to ensure safe shipping can resume at ports and coastal waters to support local economic recovery.

NOAA's fleet is also critical for modern ocean exploration. The *Okeanos Explorer* cost less than 1 percent of the estimated $2 billion NASA mission to Europa.[2] And yet the *Okeanos Explorer* is reaching and exploring places in the ocean that are even more foreign and unknown to us than our solar system. We can explore new horizons here on earth for a tiny fraction of the cost of exploring space. But we cannot do it without NOAA ships.

Coast Guard Fleet

The Coast Guard fleet provides numerous beneficial services to the U.S. economy and national security. For example, the Coast Guard fleet patrols U.S. waters to enforce maritime and fisheries laws, like the Magnuson-Stevens Act and laws that forbid illegal fishing by foreign boats. It also provides a critical safety net when vessels—including fishing vessels—encounter trouble on the seas. The presence or absence of Coast Guard vessels can be a matter of life and death.

In the Arctic, as sea ice diminishes and maritime activity in the region grows, the need for additional Coast Guard icebreaking capacity will only become more acute. At this time, the Coast Guard operational icebreaking fleet consists of one heavy icebreaker commissioned in 1976 and one medium icebreaker commissioned in 2000. Investment in new Polar Security cutters is a critical first step toward increased icebreaking capacity that will enable the Coast Guard to better meet its national security, search and rescue, law enforcement, environmental protection, and other missions in Arctic waters.

Without the proper fleets of ships, we cannot appropriately conduct science, monitor the health of our fisheries, respond to environmental disasters including oil spills, enforce environmental laws that protect the oceans, and establish a peaceful U.S. presence in frontier regions like the Arctic.

Sincerely,

JANIS SEARLES JONES,
Chief Executive Officer,
Ocean Conservancy.

ENVIRONMENTAL DEFENSE FUND
Washington, DC, October 24, 2018

Hon. JOHN THUNE, Chairman,
Hon. BILL NELSON, Ranking Member,
Committee on Commerce, Science, and Transportation,
United States Senate,
Washington, DC.

Dear Chairman Thune and Ranking Member Nelson:

Thank you for convening a hearing on the important topic of the recapitalization of the National Oceanic and Atmospheric Administration (NOAA) and Coast Guard fleets. The Environmental Defense Fund (EDF) and its two million members and supporters advocate for solutions that both protect the environment and promote economic development. Our Oceans program focuses on sustainable fisheries management, including many issues brought before this Committee. EDF strongly supports revitalization of the NOAA and Coast Guard fleets.

EDF is keenly aware of the vital role played by NOAA and Coast Guard vessels. NOAA vessels undertake critical research on the marine ecosystem, including tracking the abundance of fish and other marine animals. These data are included in stock assessments, which form the foundation for determining overfishing levels, species rebuilding schedules, and the appropriate amount of catch permissible in each fishery. Inadequate resources to maintain and update the fleet can result in vessels being abruptly removed from service, requiring delays in or even cancellation of scheduled scientific work. As a result, the fundamental underpinnings of our

[2] *https://products.kitsapsun.com/archive/2004/09-14/9561_navy_ship_deemed_capable_of_conve.html*

world-class fisheries management system may be undermined, resulting in environmental damage, lost economic opportunity, and mistrust by stakeholders in fisheries regulations. Similarly, the Coast Guard performs essential missions to protect life at sea and help enforce rules that ensure fairness and sustainability in our fisheries.

Very simply, the environment and the economy both rely on the critically important work of the NOAA and Coast Guard fleets. For many years, resources have lagged behind data collection, enforcement and other needs. We strongly support the agencies' efforts to recapitalize their fleets so as to protect fisheries resources, the marine environment more generally, the lives of fishermen and other boaters, and the extensive economic activity that relies on the proper functioning of NOAA and Coast Guard vessels.

Thank you for your consideration of our views on this important issue and for your support in providing adequate resources to support NOAA and Coast Guard fleet recapitalization.

Very truly yours,

MATT TINNING,
Associate Vice President, Oceans.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TAMMY BALDWIN TO RADM MICHAEL J. SILAH

Question 1. For each of the last five fiscal years, how much taxpayer money has NOAA spent on fleet-related equipment and services provided by foreign companies? This amount should include all contracts and subcontracts with foreign companies.

Answer. Over the last five fiscal years NOAA spent $2.7 million on foreign business contracts. The majority of the contracts were for parts and equipment that must be provided by the original vendor or manufacturer. Further, approximately $1 million was for contracts that foreign businesses received via competition. Of those competed contracts, the majority were for foreign port services while our vessels are sailing internationally.

Question 2. Please provide detailed examples of NOAA contracts or subcontracts with foreign companies for fleet-related equipment and services.

Answer. The majority of contracts with foreign companies are not competitive because the equipment being purchased is the only piece of equipment on the market that can meet NOAA's needs, such as transducers or other equipment where the company is the original equipment manufacturer. Another example of NOAA contracting with foreign companies is for port husbanding services at foreign ports while a ship is sailing internationally.

Question 3. What proactive steps, if any, does NOAA take to seek contracts or subcontracts with American manufacturers and small businesses in cases where the law does not require you to do so?

Answer. NOAA includes the Buy American Act in applicable solicitations and contracts. The Buy American Act applies to all acquisitions for the purchase of supplies, and requires that all supplies are domestic end products unless an exemption, such as public interest, non-availability, unreasonable cost, resale, and information technology that is a commercial item, applies. In addition, the Buy American Act requires, with some exceptions, the use of only domestic construction materials in contracts for construction in the United States. Thanks to efforts by the Senate Commerce Committee, a provision in the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (P.L. 115–232), provides the Secretary of Commerce the same discretionary authority as the Secretaries of Transportation, the Army, the Navy, and the Air Force to waive bonding requirements for contracts for construction and major repair of NOAA vessels, which will increase the competitiveness of smaller U.S.-based shipyard and repair facilities that are most appropriately suited for NOAA vessel repair contracts.

Question 4. Has NOAA experienced increased lifecycle costs resulting from the use of foreign-made components or had difficulty repairing or finding replacements for foreign-made components? If so, please provide specific, detailed examples.

Answer. In some cases, NOAA has found it difficult to procure foreign-made components of our equipment, because they are not readily available in the United States. In those cases, NOAA is required to procure the part from the original equipment manufacturer and shipping times, customs and security clearances have delayed the arrival of parts. An example is motor repairs for the NOAA Ship *Henry Bigelow:* Nidec-Ansaldo (Italy). Motor windings were sourced in Italy to ensure compatibility and operation within specifications, per the original equipment manufacturer's recommendations. Component material, including coil wire with metric units,

is most easily produced and sourced in Europe and could not be replaced with material available stateside.

Question 5. For decades, NOAA has done great research in the Great Lakes, particularly at the Great Lakes Environmental Research Laboratory and also at the National Estuarine Research Reserve in Superior, Wisconsin. But to my knowledge, NOAA has never had a ship in the Great Lakes. Admiral Silah, I believe this has contributed to a lack of data that is required to address some of the most pressing challenges facing the Great Lakes, including: the need to map with hydrographic surveys most of Lake Superior; harmful algal blooms; invasive species; and climate change. From NOAA's perspective, what data gaps exist in the Great Lakes?

Answer. The Great Lakes comprise the largest freshwater system on earth and are critical to the region's drinking water supplies, shipping, tourism, and recreational economies. NOAA has 13 vessels ranging in size from 13 to 80 feet supporting our Great Lakes data collection efforts, carrying out work related to harmful algal bloom monitoring, fisheries, and water quality testing, as well as buoys and the Great Lakes Observing System. NOAA appreciates the ecological and economic importance of the Great Lakes and works to ensure it collects critical data related to the region. NOAA is continually assessing data needs nationwide in its efforts to improve its forecasting, monitoring, and prediction capabilities to address challenges.

Question 6. And does NOAA plan to use any of its current or future recapitalized fleet to address these challenges, including through homeporting a ship in the Great Lakes?

Answer. NOAA has no plans to homeport any vessels in the Great Lakes. The requirements NOAA has in the Great Lakes are most cost-effectively met using a fleet of smaller vessels, such as those that are located at the Great Lakes Environmental Research Laboratory in Michigan. NOAA is in the process of starting the development of a small boat recapitalization plan that will analyze NOAA's small boat fleet, similar to what was recently completed with the NOAA Fleet Recapitalization Plan. The plan is expected to assess NOAA's capacity for meeting its small boat requirements in the Great Lakes in the long term.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. EDWARD MARKEY TO RADM MICHAEL J. SILAH

Question 1. In 2017, of 8,700 days at sea requested for NOAA ships, 3,600, over 40 percent, were unmet. That's a lot of research left on the table. NOAA's 2016 Fleet Recapitalization Plan recommended increasing the use of charters and strengthening partnerships across both Federal and academic sectors to increase capacity. To what extent is NOAA currently partnering with the Navy and Coast Guard to increase capacity fulfill its research missions? How could these partnerships be further enhanced?

Answer. NOAA enjoys a positive relationship with the U.S. Navy. A formal Memorandum of Agreement (MOA) is in place between NOAA and the Oceanographer of the Navy through 2023. This MOA highlights the important role the Oceanographer of the Navy serves as Naval Deputy to NOAA, and also prioritizes cooperative efforts regarding meteorology, oceanography, geospatial information and services, astronomy, precise time interval, remote sensing, navigation and environmental readiness. NOAA's Office of Marine and Aviation Operations has been partnering with the Navy since 2017 on the design and construction of new research vessels, and has longstanding ship moorage and facilities use agreements that greatly improve NOAA's maritime operational flexibility.

NOAA and the U.S. Coast Guard have a robust partnership that continues to expand. NOAA and Coast Guard leadership work together to maximize efficiencies between the two agencies in providing services that support our Nation's economic success while safeguarding our natural resources. There are numerous Memorandums of Understanding (MOU) and interagency agreements between NOAA and Coast Guard. Two prominent agreements are the Fleet Plan (October 2014) and Cooperative Maritime Strategy (February 2013). Other agreements include an officer exchange with a NOAA officer assigned to the Coast Guard icebreaker Polar Star, a senior officer assigned to Coast Guard HQ as NOAA Liaison, and a Joint Officer Training Center where NOAA and Coast Guard Officer Candidates train together. NOAA conducts research missions aboard Coast Guard icebreaker Healy, most recently in August 2018. The agencies are working together with unmanned systems to maximize efficiencies gained by sharing knowledge and expertise. NOAA will be partnering with Coast Guard on several upcoming Unmanned Aircraft System oper-

ational exercises planned for 2019, incorporating NOAA Fisheries law enforcement missions into the Coast Guard training exercises.

To enhance the already strong partnerships between NOAA and the Navy/Coast Guard, it is recommended that the agreements between the agencies are renewed and the organizations continue to engage to maximize efficiencies as opportunity and technological advancements present themselves.

Question 2. In what condition are the smaller NOAA vessels based in Massachusetts, such as the *Auk,* based at the Gerry E. Studds—Stellwagen Bank National Marine Sanctuary?

Answer. NOAA has three vessels based at the Stellwagen Bank National Marine Sanctuary:

- The *R/V Auk* is a 50 ft. aluminum catamaran, capable of supporting a larger science crew for critical offshore work, including monitoring, site characterization, diving needs, and education and outreach. The vessel, built in 2006, is currently in very good condition and a service life extension is currently planned for 2023.
- The *T/T Auk* (aka Auk-tender) is a 11 ft. inflatable that is suitable for local sites and fair weather only. The Auk-tender is stowed in a cradle on the Auk and deployed from its deck. It was built in 2006 and will continue to perform adequately through 2022.
- *R1606* is a 16 ft. rigid hull inflatable, kept on a trailer. It was built in 2009 and will continue to perform adequately through 2022.

A recent report issued by the Office of National Marine Sanctuaries (ONMS), the *Small Boat Program Fleet Assessment Report,* was published in April 2018 and has additional information on the condition and uses of the ONMS small boat fleet.

Question 3. In what condition are the smaller research vessels used by NOAA facilities in Massachusetts such as the Greater Atlantic Regional Office and Science Center? What are the plans for their refurbishment and eventual replacement?

Answer. The NOAA R/V *Gloria Michelle* is a 72 ft., 96 ton stern trawler built in 1974 and acquired by NOAA in 1980 through a drug seizure. Recent audiogage readings have shown that the 44 year old vessel has sound hull thickness with only minor deterioration. Thinning spots were cut out and replaced with new sheet metal. Engineering upgrades to the trawl winches, hydraulic system, generators, and main engine, over the last three years have extended the life of the vessel. We expect safe and reliable service into the near future to support a large number of new and long-term research objectives.

The NOAA R/V *Victor Loosanoff* is 49′10″ long and 38 gross tons, built in 1995 for the U.S. Coast Guard and transferred to NOAA in 2001. The vessel is in good condition and received long term maintenance (hull blasted and painted, shafts, rudders, keel coolers and propellers were reconditioned) over the last two years, which is expected to extend the vessel life by 10 years.

There are currently no plans to replace the *Gloria Michelle* or the *Victor Loosanoff.* The Northeast Fisheries Science Center will continue to maintain and refurbish the two research vessels with revenue generated through their daily charter rate. Eventually, replacement of the Gloria Michelle will be required.

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