



Statement of

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Introduction

Chairman Courtney, Ranking Member Wittman, distinguished members of the subcommittee, thank you for the opportunity to appear before you today to testify on future force structure requirements for the U.S. Navy. This is a topic I have worked on for Congress throughout my 36 years as a CRS specialist in naval affairs. (My biography is shown in **Appendix A**.)

As requested, this statement addresses the FY2021 Navy 30-year shipbuilding plan and Integrated Naval Force Structure Assessment (INFSA) in connection with Congress's assessment and markup of the Navy's FY2021 budget submission.

This statement draws from some of my CRS reports for Congress, particularly my report on Navy force structure and shipbuilding plans.¹

FY2021 Navy 30-Year Shipbuilding Plan

Statutory Requirement to Submit a 30-Year Plan Each Year

10 U.S.C. §231 states that the Secretary of Defense “shall include” a 30-year Navy shipbuilding plan “with the defense budget materials for a fiscal year.” The requirement for DOD to submit an annual 30-year Navy shipbuilding plan has been in place for most years since the time of DOD's FY2001 budget submission.²

Role of 30-Year Plan in Supporting Congress's Assessment and Markup of Proposed Shipbuilding Budget

The annual 30-year shipbuilding plan is intended to provide Congress with supporting information for assessing and marking up the Navy's proposed shipbuilding program. CRS and CBO testified on the value to Congress of the 30-year shipbuilding plan at a June 1, 2011, hearing before the Oversight and Investigations Subcommittee of the House Armed Services Committee. In its testimony, CRS stated:

The main purpose of the 30-year shipbuilding plan is to support effective congressional oversight of DOD plans for Navy shipbuilding by giving Congress information that is important to performing this oversight function but not available in the five-year data of the Future Years Defense Plan

¹ CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

² The first 30-year shipbuilding plan—the FY2001 30-year plan, which DOD submitted in 2000—was submitted under a one-time-only legislative provision, Section 1013 of the FY2000 National Defense Authorization Act (S. 1059/P.L. 106-65 of October 5, 1999). No provision required DOD to submit a 30-year shipbuilding plan in 2001 or 2002, when Congress considered DOD's proposed FY2002 and FY2003 DOD budgets, respectively. Section 1022 of the FY2003 Bob Stump National Defense Authorization Act (H.R. 4546/P.L. 107-314 of December 2, 2002) created a requirement to submit a 30-year shipbuilding plan each year, in conjunction with each year's defense budget. This provision was codified at 10 U.S.C. §231. The first 30-year plan submitted under this provision was the one submitted in 2003, in conjunction with DOD's proposed FY2004 budget. Section 1023 of the FY2011 Ike Skelton National Defense Authorization Act (H.R. 6523/P.L. 111-383 of January 7, 2011) amended 10 U.S.C. §231 to require DOD to submit a 30-year shipbuilding plan once every four years, in the same year that DOD was required to submit a Quadrennial Defense Review (QDR). Section 1011 of the FY2012 National Defense Authorization Act (H.R. 1540/P.L. 112-81 of December 31, 2011) amended 10 U.S.C. §231 to reinstate the requirement to submit a 30-year shipbuilding plan each year, in conjunction with each year's defense budget.

(FYDP). The 30-year plan supports effective congressional oversight of DOD plans for Navy shipbuilding in at least five ways:

- The 30-year shipbuilding plan enables Congress to assess whether the Navy intends to procure enough ships to achieve and maintain its stated ship force-level goals....
- The 30-year shipbuilding plan helps Congress determine whether there is a fundamental imbalance between Navy program goals and projected Navy resources...
- The 30-year shipbuilding plan helps Congress to assess whether DOD ship procurement plans are likely to be affordable within future defense budgets....
- Supporting information provided in conjunction with the 30-year shipbuilding plan enables Congress to assess whether Navy ship procurement planning is reasonable in terms of assumed service lives for existing ships and estimated procurement costs for new ships....
- The 30-year shipbuilding plan enables Congress to assess the potential industrial-base implications of DOD's intentions for ship procurement.³

In its testimony, CBO similarly stated:

The 30-year ship and aircraft plans benefit Congressional oversight and decisions about funding in at least three different ways:

- Thirty-year plans may reveal cumulative long-term effects of annual appropriation decisions that may not be apparent from a shorter perspective.
- Such plans may also reveal imbalances between long-term objectives for inventories and projected budgetary resources.
- The plans provide information on DoD's assumptions about the service lives of major weapons systems and how those assumptions may affect its inventory goals.⁴

In addition to requiring DOD to submit the 30-year plan with its annual defense budget materials, 10 U.S.C. §231 requires CBO to submit, within 60 days of the submission of the Navy's 30-year shipbuilding plan, a report providing its own independent assessment of the cost and prospective affordability of the plan. CBO's report forms a significant element of the annual discussion of the Navy's shipbuilding program. A delay in the submission of the 30-year shipbuilding plan will likely lead to a delay in the submission of CBO's report.

History of Past Submissions

Since DOD's FY2001 budget submission, there have been three years when DOD was statutorily required to submit a 30-year shipbuilding plan but did not do so. Two of those occasions—relating to DOD's budget submissions for FY2010 and FY2018—occurred during the first years of the Obama and Trump Administrations, respectively. In those two instances, the absence of a 30-year shipbuilding plan was understood to reflect the need for a new administration to spend its first year reviewing and revising the previous administration's defense plans. The other exception occurred with DOD's FY2006 budget

³ Statement of Ronald O'Rourke, Specialist in Naval Affairs, Congressional Research Service, before the House Armed Services Committee Subcommittee on Oversight and Investigations hearing on the Department of Defense's 30-Year Aviation and Shipbuilding Plans, June 1, 2011, pp. 1-2.

⁴ Congressional Budget Office, Statement of Eric J. Labs, Senior Analyst for Naval Forces and Weapons, [on the] The Value of 30-Year Defense Procurement Plans for Congressional Oversight and Decisionmaking before the Subcommittee on Oversight and Investigations, Committee on Armed Services, U.S. House of Representatives, June 1, 2011, p. 1.

submission, when DOD submitted a brief (four-page) interim document that included few details about projected ship procurements over the 30-year period.⁵

Delay in Submission of FY2021 30-Year Plan

To my knowledge, DOD as of the end of May had not submitted the FY2021 30-year shipbuilding plan, and had not provided in public a specific date by which it intends to submit the plan. If DOD does not submit an FY2021 30-year plan, it would be the first time since DOD's FY2006 budget submission that an administration not in its first year in office was required to submit a 30-year shipbuilding plan but did not do so.

Potential Institutional Issue for Congress

The delay in the submission of the FY2021 30-year shipbuilding plan raises a potential institutional issue for Congress regarding executive branch compliance with statutory requirements that are intended to support Congress's role in conducting oversight of executive branch operations. This potential institutional issue is not the only one that Congress may consider in connection with the Navy's FY2021 budget submission—an additional one is posed by the budget submission's treatment of the procurement dates of the aircraft carrier CVN-81 and the amphibious ships LPD-31 and LHA-9 (see **Appendix B**).

Integrated Naval Force Structure Assessment (INFSA)

Current 355-Ship Goal Based on 2016 FSA

The Navy's current 355-ship force-level goal is the result of a Force Structure Assessment (FSA) conducted by the Navy in 2016. An FSA is an analysis in which the Navy solicits inputs from U.S. regional combatant commanders (COCOMs) regarding the types and amounts of Navy capabilities that CCDRs deem necessary for implementing the Navy's portion of the national military strategy and then translates those CCDR inputs into required numbers of ships, using current and projected Navy ship types. The analysis takes into account Navy capabilities for both warfighting and day-to-day forward-deployed presence.⁶ The Navy conducts a new FSA or an update to the existing FSA every few years, as circumstances require, to determine its force-structure goal.

Although the result of an FSA is often reduced for convenience to a single number (e.g., 355 ships), FSAs take into account a number of factors, including types and capabilities of Navy ships, aircraft, unmanned vehicles, and weapons, as well as ship homeporting arrangements and operational cycles. Thus, although

⁵ The interim document for the FY2006 budget stated: "The Final FY 2006 report [on the 30-year shipbuilding plan] will be submitted in Summer 2005 which will allow the report to incorporate the recommendations of the Executive Steering Committee (ESC) on Long Term Shipbuilding established by the Assistant Secretary of the Navy (RD&A) [Research, Development, and Acquisition] and [the] DCNO [Deputy Chief of Naval Operations] ([for] Warfare Requirements & Programs) (N6/7) and benefit from the mature QDR (Quadrennial Defense Review) process." (*An Interim Report to Congress on Annual Long-Range Plan For The Construction Of Naval Vessels For FY2006*, undated, released ca. March 23, 2005, p. 1.) The interim report presented potential Navy force-level goals of 260 and 325 ships, but, as stated by CBO, "The Navy's [interim] report provides few details about how many ships the service would have to buy each year to implement either the 260- or 325-ship plan—and thus how big a budget it would need for ship construction." (Congressional Budget Office, *Resource Implications of the Navy's Interim Report on Shipbuilding*, April 25, 2005., p. 1.) A final report on the FY2006 30-year plan was not released.

⁶ For further discussion, see U.S. Navy, *Executive Summary, 2016 Navy Force Structure Assessment (FSA)*, December 15, 2016, pp. 1-2.

the number of ships called for by an FSA might appear to be a one-dimensional figure, it actually incorporates multiple aspects of Navy capability and capacity.

2016 FSA to Be Succeeded by INFSA

A new FSA—called the Integrated Naval FSA (INFSA), with the term naval referring to both the Navy and Marine Corps (i.e., the two naval services)—is now underway as the successor to the 2016 FSA.⁷ Department of the Navy (DON) officials have stated that they are referring to the new FSA as an integrated naval FSA to emphasize that it will integrate Marine Corps requirements into the FSA process more fully than have previous FSAs. DON officials state that the INFSA will take into account the Trump Administration’s December 2017 National Security Strategy (NSS) document and its January 2018 National Defense Strategy (NDS) document, both of which put an emphasis on renewed great power competition with China and Russia.⁸ It will also take into account updated information on Chinese and Russian naval and other military capabilities and recent developments in new technologies, including those related to unmanned vehicles (UVs).⁹

INFSA Could Substantially Alter Navy’s Top-Level Ship Force-Level Goal

Statements from Navy officials in February 2020 suggested that the INFSA could result in a new Navy force-level goal for a fleet of about 390 manned ships plus about 45 unmanned or optionally manned ships, for a total of about 435 manned and unmanned or optionally manned ships.¹⁰ Navy officials have provided few additional details in public about the composition of this 390/435-ship force-level goal.

⁷ A September 27, 2019, press report stated that on September 6, 2019, the Chief of Naval Operations and the Commandant of the Marine Corps signed a memorandum stating that the two services will develop a “comprehensive naval force architecture” to inform the new FSA, and that the new FSA will be developed as an integrated naval (i.e., Navy-Marine Corps) FSA (INFSA). (Mallory Shelbourne, “Navy, Marine Corps Conducting Integrated Force-Structure Assessment,” *Inside Defense*, September 27, 2019. See also Otto Kreisher, “New Force Structure Assessment Will Address Needs of ‘Great Power Competition,’ Two Top Requirements Officers Say,” *Seapower*, October 22, 2019, and the section under the subheader “Naval Integrated Force Structure Assessment” in Megan Eckstein, “Navy Marines Wargaming New Gear to Support Emerging Warfare Concepts,” *USNI News*, October 23, 2019.)

⁸ For additional discussion of the defense implications of great power competition, see CRS Report R43838, *Renewed Great Power Competition: Implications for Defense—Issues for Congress*, by Ronald O'Rourke.

⁹ See, for example, Marcus Weisgerber, “US Navy Re-Evaluating 355-Ship Goal,” *Defense One*, February 1, 2019; Paul McLeary, “Navy Rethinks 355-Ship Fleet: CNO Richardson,” *Breaking Defense*, February 1, 2019; Mallory Shelbourne, “CNO: Navy Expects New Force-Structure Assessment ‘Later This Year,’” *Inside the Navy*, February 4, 2019.

¹⁰ See, for example, Ben Werner, SECNAV Modly Says Nation Needs Larger, Distributed Fleet of 390 Hulls,” *USNI News*, February 28, 2020; Mallory Shelbourne, “Modly Sketches Out Potential Navy Force Structure Changes, Anticipates 390-Ship Fleet,” *Inside Defense*, February 28, 2020; Rich Abott, “Modly Reveals Next Force Structure Assessment Details, Working Toward 390-Ship Fleet,” *Defense Daily*, February 28, 2020; Patrick Tucker, “Acting Navy Secretary: We Need More than 355 Ships, and That’s Not Even Counting Robot Vessels,” *Defense One*, February 28, 2020; Connor O’Brien, “Acting Navy Secretary Hints At Larger Fleet Goal,” *Politico Pro*, February 28, 2020.

INFSA Could Implement a Once-in-a-Generation Change in Fleet Architecture

Overview of Proposed Change

Statements from DON officials have further suggested that the INFSA could result in a once-in-a-generation change in the Navy's fleet architecture, meaning the mix of ships that make up the Navy and how those ships are combined into formations to perform various missions. More specifically, statements from DON officials suggest that the INFSA could shift the fleet to a more-distributed architecture that includes a reduced proportion of larger ships, an increased proportion of smaller ships, and a newly created category of large unmanned surface vehicles (USVs) and large unmanned underwater vehicles (UUVs). Such a change in fleet architecture could alter, perhaps substantially, the mix of ships to be procured for the Navy and the distribution of Navy shipbuilding work among the nation's shipyards. For additional information on potential changes to various parts of the Navy's force structure under this new fleet architecture, see **Appendix C**.

Operational Rationale for Proposed Change

To improve their ability to perform various missions in coming years, including a potential mission of countering Chinese forces in a possible conflict in the Western Pacific, the Navy and Marine Corps want to implement a new operational concept called Distributed Maritime Operations (DMO).¹¹ DMO calls for U.S. naval forces to operate at sea in a less concentrated, more distributed manner, so as to complicate an adversary's task of detecting, identifying, tracking, and targeting U.S. naval forces, while still being able to bring lethal force to bear against adversary forces.

To implement DMO, the Navy wants to shift to the more-distributed fleet architecture mentioned above. As discussed further in a separate CRS report,¹² Navy and Marine Corps officials argue that a more distributed fleet architecture

- has become necessary due to China's improving anti-ship capabilities;
- is technically feasible due to improvements in networking and unmanned vehicle technologies;
- will be just as lethal, if not more lethal, than today's fleet architecture; and
- will be no more expensive, and perhaps less expensive in some respects, than today's fleet architecture.

Release of INFSA Postponed Repeatedly

Through much of 2019, Navy officials stated that the INFSA was to be completed by the end of 2019. A September 27, 2019, press report stated that an interim version was to be completed by September 2019, in time to inform programmatic decisions on the FY2022 Program Objective Memorandum (POM), meaning the in-house DOD planning document that will guide the development of DOD's FY2022

¹¹ For additional discussion, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke, and CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke.

¹² See CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

budget submission.¹³ A December 6, 2019, memorandum from then-Acting Secretary of the Navy Thomas Modly stated that he expected the final INFSA to be published no later than January 15, 2020.¹⁴ A January 23, 2020, press report quoted Modly as saying that the January 15 date was an internal Navy deadline, and that the Navy expected the INFSA to be released to outside audiences sometime during the spring of 2020.¹⁵

OSD Reviewing INFSA and Conducting Its Own Assessment of Navy Force Structure

More recently, it has been reported that Secretary of Defense Mark Esper and the Cost Assessment and Program Evaluation (CAPE) office within the Office of the Secretary of Defense (OSD) have been reviewing the INFSA and conducting their own analysis of future Navy force structure requirements, and that the INFSA will not be released until OSD completes its review and analysis.¹⁶ OSD's study of future Navy force-level requirements reportedly recommends a fleet with, among other things, 68 or 69 nuclear-powered attack submarines (SSNs), nine aircraft carriers, 80 to 90 large surface combatants (i.e., cruisers and destroyers), 55 to 70 small surface combatants (i.e., frigates and Littoral Combat Ships [LCSs]), 65 unmanned or lightly manned surface vehicles, and 50 extra-large unmanned underwater vehicles (XLUUVs).¹⁷

Lack of Access to INFSA Could Impact Congress's Assessment and Markup of Navy's Proposed FY2021 Budget Submission

In light of the potential scope of changes to the Navy's top-level force-level goal and fleet architecture that could be reflected in the INFSA, not having access to the INFSA could impact Congress's ability to assess and mark up the Navy's FY2021 budget submission. Without access to the INFSA, Congress could be in a position of assessing and marking up requests for procuring types of ships whose total

¹³ Mallory Shelbourne, "Navy, Marine Corps Conducting Integrated Force-Structure Assessment," *Inside Defense*, September 27, 2019. See also Otto Kreisher, "New Force Structure Assessment Will Address Needs of 'Great Power Competition,' Two Top Requirements Officers Say," *Seapower*, October 22, 2019, and the section under the subheader "Naval Integrated Force Structure Assessment" in Megan Eckstein, "Navy Marines Wargaming New Gear to Support Emerging Warfare Concepts," *USNI News*, October 23, 2019.

¹⁴ Memorandum for distribution from Acting Secretary of the Navy Thomas B. Modly, subject "SecNav Vector !," dated December 6, 2019. See also David B. Larter, "Acting US Navy Secretary: Deliver Me a 355-Ship Fleet by 2030," *Defense News*, December 9, 2019.

¹⁵ Mallory Shelbourne, "Modly: Navy Expects to Release FSA by Spring," *Inside Defense*, January 23, 2020.

¹⁶ See, for example, Sam LaGrone, "SECDEF Esper Holds Back 30-Year Shipbuilding Outlook, New 355-Ship Plan Ahead of HASC Testimony," *USNI News*, February 25, 2020; Paul McLeary, "Esper To Navy: Rethink Your Shipbuilding Plan," *Breaking Defense*, February 25, 2020; Ben Werner, "SECDEF Esper Blames Failures of Optimized Fleet Response Plan for Delay of New 355-Ship Fleet Outlook," *USNI News*, February 26, 2020; Paul McLeary, "EXCLUSIVE: SecDef Esper Seeks Détente With HASC; New Navy Plan This Summer," *Breaking Defense*, February 28, 2020; Paul McLeary, "SecNav Details Gaps Between Navy & Pentagon Shipbuilding Plans," *Breaking Defense*, March 11, 2020; Megan Eckstein, "Modly: Parallel Fleet Studies Could Reshape Future of Aircraft Carriers," *USNI News*, March 12, 2020; David B. Larter, "Defense Department Study Calls for Cutting 2 of the US Navy's Aircraft Carriers," *Defense News*, April 20, 2020; Jack Detsch, "Trump's Navy Pick Would Have Limited Sway on Ship Goal," *Foreign Policy*, May 7, 2020; Paul McLeary, "Navy Scraps Big Carrier Study, Clears Deck For OSD Effort," *Breaking Defense*, May 12, 2020.

¹⁷ David B. Larter, "Defense Department Study Calls for Cutting 2 of the US Navy's Aircraft Carriers," *Defense News*, April 20, 2020; David B. Larter, "To Compete with China, An Internal Pentagon Study Looks to Pour Money into Robot Submarines," *Defense News*, June 1, 2020. For more on the XLUUV program, see CRS Report R45757, *Navy Large Unmanned Surface and Undersea Vehicles: Background and Issues for Congress*, by Ronald O'Rourke.

procurement quantities and place in fleet operations are subject to potentially substantial change from what is reflected in the Navy's 355-ship force-level goal and current fleet architecture.

Some General Observations Regarding Future Force Structure Requirements for the U.S. Navy

General observations that can be made at this point regarding future Navy force structure requirements include the following.

355-Ship Force-Level Goal May Be a “Dead Man Walking”

The 355-ship force-level goal at this point may be a “dead man walking,” since it might be succeeded in coming months by a new force-level goal that could change both the top-level numerical figure and the types and numbers of ships that add up to that figure. The prospect of the 355-ship force-level goal being succeeded by a new force-level goal is not surprising, since the Navy conducts a new FSA (or updates the most-recent FSA) every few years.¹⁸ As noted earlier, the last FSA was done in 2016, prior to the release of the December 2017 NSS document and the January 2018 NDS document. The amount of change reflected in the Navy's next force-level goal, however, may be greater than average because it may reflect a once-in-a-generation change in fleet architecture.

The current 355-ship goal was made U.S. policy by Section 1025 of the FY2018 National Defense Authorization Act, or NDAA (H.R. 2810/P.L. 115-91 of December 12, 2017).¹⁹ If the 355-ship goal is succeeded by a new and different force-level goal, Congress may consider whether and how to amend Section 1025 of P.L. 115-91.

Future Navy Force Structure Requirements Could Be Affected by Potential Changes in the U.S. Role in the World

As discussed in a CRS report, some observers perceive that after remaining generally stable for a period of more than 70 years (i.e., since the end of World War II in 1945), the U.S. role in the world under the Trump Administration is undergoing a potentially historic change. A change in the U.S. role in the world could significantly affect U.S. policy in several areas, including defense plans and programs.²⁰

¹⁸ See Table B-1 in CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

¹⁹ Section 1025 of P.L. 115-91 states:

SEC. 1025. Policy of the United States on minimum number of battle force ships.

(a) Policy.—It shall be the policy of the United States to have available, as soon as practicable, not fewer than 355 battle force ships, comprised of the optimal mix of platforms, with funding subject to the availability of appropriations or other funds.

(b) Battle force ships defined.—In this section, the term “battle force ship” has the meaning given the term in Secretary of the Navy Instruction 5030.8C.

The term *battle force ships* in the above provision refers to the ships that count toward the quoted size of the Navy in public policy discussions about the Navy. The battle force ships method for counting the number of ships in the Navy was established in 1981 by agreement between the Secretary of the Navy and the Secretary of Defense, and has been modified somewhat over time, in part by Section 1021 of the Carl Levin and Howard P. “Buck” McKeon National Defense Authorization Act for Fiscal Year 2015 (H.R. 3979/P.L. 113-291 of December 19, 2014).

²⁰ See CRS Report R44891, *U.S. Role in the World: Background and Issues for Congress*, by Ronald O'Rourke and Michael Moodie

As discussed in the CRS report, a prominent dimension of the debate over the U.S. role in the world is whether the United States should attempt to continue playing the active internationalist role that it has played for the past 70 years, or instead adopt a more-restrained role that reduces U.S. involvement in world affairs. A number of critics of the U.S. role in the world over the past 70 years have offered multiple variations on the idea of a more-restrained U.S. role. Terms such as *offshore balancing*, *offshore control*, *realism*, *strategy of restraint*, or *retrenchment* have been used to describe some of these variations. The terms *offshore balancing* and *offshore control* refer in general to a policy in which the United States in effect stands off the shore of Eurasia and engages in the security affairs of Eurasia less frequently, less directly, or less expansively than the United States has done in recent decades.

As discussed in the CRS report, debate continues on the relative merits of a more-restrained U.S. role in the world compared to the U.S. role of the past 70 years. While a shift to a more-restrained U.S. role might imply a reduction in overall U.S. defense spending and the total required size and capabilities of the U.S. military, it might not necessarily imply a reduction in the Navy's budget and the required size and capabilities of the Navy, because the United States under a more-restrained role might need to rely as much or more than it does now on its ability to use the world's oceans as a buffer for protection from potential security challenges that might arise in Eurasia. A recent policy brief by an organization that advocates a more-restrained U.S. national security strategy, for example, argues that

Reduced DoD budgets can force debate and prioritization among programs and services—between what contributes to U.S. security and what is peripheral or even counterproductive—that large spending authorizations prevent.

Geography makes the U.S. a natural naval power and trading nation. Distance from other major states means the U.S. is perceived as less threatening—unlike China, which borders other Eurasia powers.

The Navy is the key service for projecting U.S. power globally and defending commerce if necessary while avoiding costly occupations. The Navy should command a larger portion of DoD's reduced budget.²¹

Future Navy Force Structure Requirements Could Be Affected by the International Impacts of the COVID-19 Pandemic

As discussed in another CRS report, some observers argue the COVID-19 pandemic could be a world-changing event with potentially profound and long-lasting implications for the international security environment and the U.S. role in the world. Other observers are more skeptical that the COVID-19 pandemic will have such effects.²²

As discussed in the CRS report, observers who argue the COVID-19 pandemic could be world-changing for the international security environment and the U.S. role in the world have focused on several areas of potential change, including world order, international institutions, and global governance; U.S. global leadership and the U.S. role in the world; China's potential role as a global leader; U.S. relations and great power competition with China and Russia; allied defense budgets and U.S. alliances; the definition of, and budgeting for, U.S. national security; and U.S. defense strategy, defense budgets, and military operations.

The CRS report notes, among other things, that:

²¹ Benjamin H. Friedman, *Restraint: A Post-COVID-19 U.S. National Security Strategy*, Defense Priorities, May 2020, p. 3.

²² CRS Report R46336, *COVID-19: Potential Implications for International Security Environment—Overview of Issues and Further Reading for Congress*, by Ronald O'Rourke, Kathleen J. McInnis, and Michael Moodie.

- Some observers have focused on the question of whether the COVID-19 situation will (or should) lead to a revised definition of U.S. national security, particularly one that is less military-centric and more focused on what are sometimes called human-security-oriented challenges or global issues, such as climate change, that are currently more toward the periphery of U.S. national security policy and plans. Such a change in definition could lead to a changed allocation of funding between the Department of Defense (DOD) and other government agencies that perform national-security-related tasks, a realignment of resources within DOD between combat-oriented programs and other programs (such as those related to DOD's mission of providing defense support of civil authorities), and perhaps a changed allocation of funding among the agencies other than DOD that perform national-security-related tasks.
- Some observers have focused on the question of whether the large federal expenditures being made in response to the domestic U.S. economic effects of the COVID-19 pandemic, and the impact these expenditures will have on the federal budget deficit and federal debt, could lead to greater constraints in coming years on U.S. defense spending levels. As a follow-on matter, these observers are additionally focusing on the question of whether responding to such increased constraints will (or should) lead to revisions in U.S. defense strategy, changes in U.S. defense programs, and a reduction or termination of certain overseas U.S. military operations.
- Some observers have focused on the possibility that the costs that U.S. allies are incurring to support their economies during stay-at-home/lockdown periods will lead to offsetting reductions in their defense expenditures. Some observers argue that the NATO allies in Europe in particular may experience contractions in their defense budgets for this reason. More generally, some observers argue that if the COVID-19 pandemic causes a global recession, allied defense budgets could be further reduced.

Developments such as those above could affect future force structure requirements for the Navy in numerous potential ways. At the same time, enduring fundamentals such as the basic features of world geography and the physics of the world's oceans as an operating medium might act as sources of stability in assessments of future Navy force structure requirements, even in the presence of international impacts from the COVID-19 pandemic.

China's Naval Modernization Effort and Future Navy Force Structure Requirements

As discussed in the CRS report on China's naval modernization effort,²³ China's military modernization effort, including its naval modernization effort, has become the top focus of U.S. defense planning and budgeting. China has been steadily modernizing its navy for more than 25 years, since the early to mid-1990s. As a result of this modernization effort, China's navy has become a formidable military force within China's near-seas region, and it is conducting a growing number of operations in more-distant waters, including the broader waters of the Western Pacific, the Indian Ocean, and waters around Europe. China's navy is viewed as posing a major challenge to the U.S. Navy's ability to achieve and maintain wartime control of blue-water ocean areas in the Western Pacific—the first such challenge the U.S. Navy has faced since the end of the Cold War—and forms a key element of a Chinese challenge to the long-standing status of the United States as the leading military power in the Western Pacific.

²³ CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke. This report was first published in November 2005 and has been updated more than 140 times since then.

As discussed in the report, DOD states that China's navy from 2005 to 2019 experienced a net increase of 119 combat ships, of which about 65% (a net increase of 77 ships out of the net total of 119) resulted from increases in missile-armed fast patrol craft starting in 2009 (a net increase of 35 ships) and corvettes starting in 2014 (42 ships). The net 35-ship increase in missile-armed fast patrol craft was due to the construction between 2004 and 2009 of 60 new *Houbei* (Type 022) fast attack craft and the retirement of 25 older fast attack craft that were replaced by Type 022 craft. The 42-ship increase in corvettes is due to China's *Jingdao* (Type 056) corvette program. Prior to the Type 056 program, China's navy had no corvettes. As shown in the CRS report, the number of Type 056 corvettes, which have estimated full load displacements of about 1,500 tons, has grown from zero in 2013 to 42 in 2019—an average addition of seven Type 056 ships per year.²⁴ The Office of Naval Intelligence (ONI) states that as of February 2020, more than 50 Type 056 corvettes had entered service and another 15 were under construction.²⁵ As shown in the CRS report, DOD states that China also experienced double-digit net gains from 2005 to 2019 in destroyers (net gain of 12 ships), frigates (net gain of 11 ships), and amphibious ships (net gain of 17 ships).²⁶ ONI states that “a significant portion of China's Battle Force consists of the large number of new corvettes and guided-missile frigates....”²⁷

As shown in the CRS report, ONI estimates that between 2020 and 2030, China's Navy will increase in size by an additional net total of 65 battle force ships, consisting of net increases of 33 frigates and corvettes, 22 destroyers, cruisers, and aircraft carriers, and 10 nuclear-powered attack and ballistic missile submarines.²⁸

Uncertainty Regarding Details of More-Distributed Fleet Architecture

As noted earlier, Navy officials have stated that the INFSA resulted in a requirement for a fleet of 390/435 ships, with the 435-ship figure including 45 large unmanned vehicles. Navy officials have also stated that the Navy is envisioning procuring a total of 28 to 30 Light Amphibious Warships (LAWs) between FY2023 and FY2026.²⁹ Other than these two data points, however, the Navy has provided little information in public about the total numbers of ships of various types that would make up the INFSA's new fleet architecture. This lack of information about the details of the more-distributed architecture underscores the challenge that the subcommittee faces in assessing the Navy's proposed FY2021 shipbuilding budget in the absence of access to the INFSA.

Analytical Basis for More-Distributed Fleet Architecture

Although Navy officials have spoken in public about shifting to a more-distributed fleet architecture, it is not clear to what extent the Navy has shared with Congress the details of the analytical studies and at-sea exercises and demonstrations that underpin the Navy's judgment that moving to a more-distributed fleet architecture is the best general course of action, and that the Navy's specific preferred version of such an

²⁴ See Table 1 in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke

²⁵ See the section on the Type 56 program in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke

²⁶ See Table 1 in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke

²⁷ See the section on numbers of ships and comparisons to U.S. Navy in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke

²⁸ See Table 2 in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke.

²⁹ For further discussion, see CRS Report R46374, *Navy Light Amphibious Warship (LAW) Program: Background and Issues for Congress*, by Ronald O'Rourke.

architecture is the best possible version. A lack of access to the details of such studies and at-sea exercises and demonstrations could complicate the subcommittee's task of assessing the merits of the Navy's proposed future force structure and supporting shipbuilding plans.

Affordability of Future Navy Force Structure

Overview

The prospective affordability of the Navy's desired force structure and supporting shipbuilding plans has been a principal topic of oversight for the subcommittee for many years. As noted earlier, CBO's annual report on the cost of the Navy's 30-year shipbuilding plan forms a significant element of the annual discussion of the Navy's shipbuilding program. CBO analyses of past Navy 30-year shipbuilding plans have generally estimated the cost of implementing those plans to be higher than what the Navy estimated.³⁰

Press reporting over the last several months suggests that the Navy recently has been struggling to find a way to achieve a fleet of 355 or more ships—a goal that the Trump Administration has recently underscored³¹—within projected future Navy budgets. Navy officials have stated at hearings on the Navy's FY2021 budget submission that achieving and supporting a 355-ship fleet over the next 10 years would require increasing the Navy's budget by a cumulative total of \$120 billion to \$130 billion over the next ten years, or an average of \$12 billion to \$13 billion per year. This figure, Navy officials have stated, includes not only the cost of procuring new ships, but costs associated with crewing, arming, operating, and maintaining a 355-ship fleet.³² It is not clear, however, whether such an increase in the Navy's budget will be forthcoming.

To help generate funding from within the Navy's own budget that can be devoted to achieving a larger fleet size, then-Acting Secretary of the Navy Thomas Modly in February 2020 announced that the Navy would conduct a "Stem to Stern" review of its spending with the aim of identifying \$40 billion over the next five years (i.e., an average of \$8 billion per year) that can be redirected from lower-priority efforts to the goal of achieving and maintaining a larger fleet.³³ It is not clear at this point how successful this effort will be in generating specific, actionable cost reductions (as opposed to generalized or aspirational cost-saving ideas).

Prior to this—in September and October 2019—Navy officials had stated that if Navy budgets in coming years remain at current levels in real (i.e., inflation-adjusted) terms, the Navy would not be able to properly maintain a fleet of more than 302 to 310 ships. A September 16, 2019, press report quoted then-Under Secretary of the Navy Thomas Modly as stating in a speech on that date: "I will tell you it is going

³⁰ For additional discussion, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

³¹ See, for example, Anthony Capaccio, "White House Presses Navy to Stick With Trump's 355-Ship Target," *Bloomberg*, December 20, 2019; Hugh Hewitt, "Senator Tom Cotton On NSA O'Brien's '350 Ships Means 350 Ships' Speech At Reagan Defense Forum," *HughHewitt.com*, December 10, 2019; David B. Later, "Acting US Navy Secretary: Deliver Me a 355-ship Fleet by 2030," *Defense News*, December 9, 2020.

³² See, for example, Ben Werner, "SECNAV Modly: Navy Needs Additional \$120 Billion To Build 355-Ship Fleet By 2030," *USNI News*, February 27, 2020.

³³ See, for example, Megan Eckstein and Ben Werner, "Acting SECNAV Kicks off Navy 'Night Court' Cost Savings Drive with Aim to Save \$40 Billion," *USNI News*, February 18, 2020; Paul McLeary, "Navy Looks to Slash \$40B To Build Bigger Fleet," *Breaking Defense*, February 18, 2020; Justin Katz, "Modly Announces Navy Program Review Seeking \$40B in Savings," *Inside Defense*, February 19, 2020; Ben Werner, "Navy \$40 Billion Savings Effort Linked to Force Structure Assessment," *USNI News*, February 21, 2020; Sam LaGrone, "Navy Mulling Taking Sailors off Forward Deployed Ships as Part of \$40B Savings Drive," *USNI News*, March 11, 2020.

to be very, very difficult for us to get to that number [355 ships] in any reasonable amount of time.” According to the press report, Modly stated: “If you look at our funding in the [Navy] and straight line that on our current budget projections, we can probably get to about 305 to 308 ships and sustain that over time without a significant increase in our budget.” The press report stated that “the under secretary said the service [i.e., the Navy] would likely need \$20 billion to \$30 billion more annually to achieve a 355-ship fleet ‘quickly, and when I say “quickly” I mean within five to 10 years.’”³⁴

An October 27, 2019, press report, reporting on remarks made by then-Under Secretary Modly on October 25, stated

The size of the current fleet, the high cost of new ships and the likely lack of growth in future budgets will make it difficult for the Navy to reach the current goal of a 355-ship battle fleet, the Navy’s number two civilian leader [Modly] said....

Modly went through the top 10 issues that keep him up at night, three of which dealt with the problem of buying and sustaining enough ships to get the size fleet the U.S. Navy will need for the possible future conflicts. The effort to get from the current 290-ship force to the 355 goal faces “a math problem,” he said, because future defense budgets are not likely to grow enough to buy all those ships.³⁵

An October 28, 2019, press report stated

The Navy is unlikely to field a 355-ship fleet in the near- or even mid-term future if funding doesn’t change dramatically, the department’s top leadership said during a pair of appearances last week.

The 355-ship Navy is a nice target; however, ship readiness is more critical for the service as it plans how the fleet will look in the future, Vice Chief of Naval Operations Adm. Robert Burke said Friday [October 25] while speaking with reporters at the Military Reporters and Editors conference.

“Will we get to 355-ships?” Burke said. “I think with today’s fiscal situation, where the Navy’s top line is right now, we can keep around 305 to 310 ships whole, properly manned, properly maintained, properly equipped, and properly ready.”...

“If our top line does not go up, if it remains where it is now and is projected to remain in the future defense plans, that’s about where we can get to and do it right, in terms of man those ships and maintain them and have all the ordnance for them and generate readiness,” Burke said. “We would need an increased top line.”³⁶

In January 2020, Admiral Michael Gilday, the Chief of Naval Operations, stated that fully funding the Navy’s program goals, including the attainment of a 355-ship fleet, would require allocating a larger share of DOD’s budget to the Navy.³⁷

Potential Additional Cost of 390/435-Ship Fleet Compared to 355-Ship Fleet

A Navy of 390/435 ships would have about 10%/23% more ships than a 355-ship Navy. The additional cost to expand the Navy from 355 ships to 390/435 ships, however, could be less than 10%/23%, because

³⁴ Justin Katz, “Modly Acknowledges 355 Ships Won’t Happen in ‘Reasonable’ Amount of Time,” *Inside Defense*, September 16, 2019.

³⁵ Otto Kreisher, “Modly Doubts Future Budgets Will Allow for 355-Ship Fleet,” *Seapower*, October 27, 2019.

³⁶ Ben Werner, “Admiral: Navy Can Afford to Field a 310-Ship Fleet, Not 355,” *USNI News*, October 28, 2019. See also Rich Abbott, “Navy Says Current Funding Only Supports 310 Ships,” *Defense Daily*, October 28, 2019; Paul McLeary, “Navy May Scrap Goal of 355 Ships; 310 Is Likely,” *Breaking Defense*, October 25, 2019.

³⁷ See, for example, Marcus Weisgerber, “The US Navy Needs More Money, Its Top Admiral Bluntly Argues,” *Defense One*, January 14, 2020; Sam LaGrone, “CNO Gilday Calls for Budget Increase to Reach 355 Ship Fleet; New Battle Force Count Won’t Include Unmanned Ships,” *USNI News*, January 14, 2020; John M. Doyle, “CNO Wants Larger Slice of Defense Budget to Modernize, Meet China Threat,” *Seapower*, January 15, 2020; Rich Abbott, “CNO: Ship Count Will Not Include Unmanned; Bigger Topline Needed For Fleet Goal,” *Defense Daily*, January 15, 2020.

the 390/435-ship fleet could have a larger proportion of ships that are smaller and individually less expensive in terms of their procurement costs and operation and support (O&S) costs. The above-mentioned envisioned force of 28 to 30 LAWs would be a case in point, since these ships are to be much smaller and individually much less expensive than the Navy's current amphibious ships. For the 435-ship figure, the 45 large unmanned vehicles would be another case in point.

O&S Costs

Navy officials are concerned that the growing O&S costs of the fleet could in coming years crowd out funding for other Navy program needs, including shipbuilding, and thereby make it harder for the Navy to achieve and maintain a larger fleet in coming years. The Navy highlighted this issue in its FY2020 30-year shipbuilding plan.³⁸

Although Navy officials are concerned about the fleet's rising O&S costs, Navy officials have announced few specific initiatives for making investments that could reduce the fleet's O&S costs over time. One potential option in this regard would be to study options for reducing the annual O&S costs of the Navy's DDG-51 destroyers. The first DDG-51 was procured in FY1985, more than 60 are currently in service, and under the Navy's FY2021 budget submission, a total of 95 are to be procured by about FY2027, which would make the DDG-51s numerically the largest class of ship in the Navy (and one of the largest classes the Navy has procured since World War II). Potential oversight questions for the subcommittee include: To what degree could the annual O&S costs of DDG-51s be reduced by making investments in fuel-saving technologies, components requiring less life-cycle maintenance, or automation technologies for safely reducing crew size without placing increasing burdens on individual sailors? What would be the return on investment (ROI) of such investments, and how might the ROI calculation change depending on how long DDG-51s are kept in service?

Forward-Deployed Presence as a Force-Sizing Factor

Navy force-structure requirements are established through an examination not only of requirements for warfighting, but also of requirements for maintaining day-to-day forward-deployed presence of Navy ships. Forward-deployed presence traditionally has been maintained for purposes such as reassuring allies and partners, engaging and exercising with allied and partner-country forces, and deterring potential aggressors, all of which contribute to what is sometimes referred to as shaping of the regional security environment. Forward-deployed presence also enables the Navy to become familiar with local operating conditions, and to conduct intelligence, surveillance, and reconnaissance operations, rapid crisis-response and crisis-containment operations, and timely initial combat operations in larger contingencies.

Requirements for maintaining day-to-day forward deployments of Navy ships are a significant factor in Navy force structure calculations—for some categories of ships, the number required to maintain policymaker-desired levels of day-to-day forward deployments is higher than the number required for warfighting purposes.

The number of ships of a certain kind needed to maintain a given number of those ships forward deployed on a day-to-day basis in overseas operating areas is influenced by homeporting arrangements and ship operational cycles. Measures such as forward homeporting, multiple crewing, and long-duration deployments with crew rotation can substantially reduce the number of ships needed to maintain forward

³⁸ U.S. Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, pp. 19-20. See also Paul McLeary, "Navy Wary of Growing Costs While It Ramps Up Ops," *Breaking Defense*, May 15, 2019.

deployments in an overseas operating area, but entail certain costs and risks that can limit their potential for being used. Past CRS and CBO reports have explored these issues.³⁹

Although discussion of employing additional forward homeporting often focuses on potential homeporting locations in the Indo-Pacific region, the option can also be applied in the European theater so as to release of a larger fraction of the U.S. Navy for use in supporting forward presence in the Indo-Pacific. Although it is not commonly remembered today, the Navy's substantial overseas homeporting arrangement in Japan—which includes a carrier strike group, an Amphibious Ready Group (ARG), and mine warship ships—is the result of a Navy initiative in the early 1970s to establish forward homeporting arrangements for Navy ships in both Japan and in Greece (at the port of Piraeus, which is near Athens). The Navy was in the midst of implementing the Greece homeporting initiative—surface combatants for the intended Navy carrier strike group were steaming there—when a 1973 military coup in Greece led to a U.S. decision to cancel the plan. (The homeporting of a carrier strike group in Japan went forward and has been in place since the early 1970s.) If not for the Greek military coup, the homeporting of a Navy carrier strike group in Greece might be as familiar to us today as is the homeporting of a carrier strike group and other Navy ships in Japan.

Potential options for homeporting additional Navy ships in the European theater today would not be limited to Greece—additional potential locations include ports in Italy (where the Navy's 6th Fleet flagship is currently homeported), France, and Spain (where four DDG-51s and an Expeditionary Fast Transport [EPF] ship are currently homeported). Some observers over the years have additionally suggested the port of Haifa, Israel, as a potential U.S. Navy homeporting location. Homeporting additional Navy ships in the European theater could have significant mathematical effects in terms of releasing other Navy ships for duty in the Indo-Pacific region. Navy officials reportedly are interested in the option of homeporting two additional DDG-51s in Spain, which would increase to six the number of DDG-51s homeported there.⁴⁰

Changing Navy Capabilities in the Shorter Term

Given the long construction times of Navy ships, the relatively low annual rates at which new Navy ships are procured and built, and the long expected service lives of Navy ships (which generally range from 25 years to 50 years), making substantial changes in Navy ship force structure is usually viewed as a long-term proposition. Short of carrying out wholesale retirements of existing Navy ships, substantially altering the Navy's force structure can require many years. Using today's expected service lives for Navy ships, two-thirds or more of the Navy's ships of 2030, and one-third or more of the Navy's ships of 2040, are already in operation or under construction.

Some observers who track China's military modernization effort, including its naval modernization effort, are particularly concerned about the time between now and 2030, a period that some of them refer to as the decade of concern.⁴¹ Given the limited amount of change in Navy force structure that might be

³⁹ See archived CRS Report 91-516 F, *Aircraft Carrier Force Levels and Deployment Patterns: Issues and Options*, by Ronald O'Rourke; archived CRS Report 92-803 F, *Naval Forward Deployments and the Size of the Navy*, by Ronald O'Rourke; archived CRS Report RS21338, *Navy Ship Deployments: New Approaches—Background and Issues for Congress*, by Ronald O'Rourke; archived CRS Report R44635, *Navy Force Structure: A Bigger Fleet? Background and Issues for Congress*, by Ronald O'Rourke; Congressional Budget Office, *Options for the Navy's Future Fleet*, May 2006, 85 pp.; Congressional Budget Office, *Crew Rotation in the Navy: The Long-Term Effect on Forward Presence*, October 2007, 18 pp.; Congressional Budget Office, *Preserving the Navy's Forward Presence With a Smaller Fleet*, March 2015, 29 pp.

⁴⁰ See, for example, David B. Larter and Sebastian Sprenger, "Push to Base Six US Navy Destroyers in Spain Could Be Gaining Steam," *Defense News*, March 3, 2020.

⁴¹ See, for example, Jim Fanell, "Now Hear This—The Clock is Ticking in China: The Decade of Concern Has Begun," *U.S. Naval Institute Proceedings*, October 2017; James E. Fanell and Kerry K. Gershaneck, "The Looming 'Short, Sharp War' in the

possible to implement over the next ten years through changes in shipbuilding programs, efforts to address concerns about the Navy's ability to counter China's improving maritime military capabilities over the next 10 years might additionally focus on other types of efforts that can achieve results within a few years, including:

- Improving the readiness of existing ships by bolstering funding for Navy ship overall and repair work, more fully manning Navy ships, and improving the training of shipboard personnel;
- Procuring additional aircraft and missiles and deploying them on existing ships; and
- Upgrading radars and other combat system equipment on existing ships.

Attack Submarines in the Navy's Future Force Structure

Superiority in undersea warfare is considered a crown jewel among U.S. military capabilities, and SSNs are viewed as highly effective platforms for countering China's improving maritime anti-access/area-denial (A2/AD) capabilities. Navy officials have provided no indication that the INFSA will reduce the Navy's current 66-boat force-level goal for SSNs. As noted earlier, OSD's study of Navy force-level requirements reportedly recommends increasing the SSN force-level goal by two or three boats, to a total of 68 or 69 boats.

As discussed in the CRS report on the Virginia-class attack submarine program,⁴² the Navy's force of SSNs is projected to experience a valley or trough from the mid-2020s through the early 2030s, reaching a minimum of 42 boats (i.e., 24 boats, or about 36%, less than the 66-boat force-level goal) in FY2027-FY2028. This projected valley is a consequence of having procured a relatively small number of SSNs during the 1990s, in the early years of the post-Cold War era. Some observers are concerned that this projected valley in SSN force levels could lead to a period of heightened operational strain for the SSN force, and perhaps a period of weakened conventional deterrence against potential adversaries such as China.

The projected SSN valley was first identified by CRS in 1995, in testimony to the House Armed Services Committee, and has been discussed in CRS reports and testimony every year since then. As one measure for mitigating this valley, the Navy is proposing to refuel and extend the service lives of five to seven Los Angeles (SSN-688) class submarines.

Aircraft Carriers in the Navy's Future Force Structure

Aircraft carriers are frequently at the center of discussions of future Navy force structure, including discussions about whether and how to shift the Navy to move toward a more-distributed fleet architecture. Much of the discussion focuses on the procurement cost and prospective wartime survivability and mission utility of carriers.

The operating range of Navy carrier air wings is a key component of the debate over carrier wartime survivability and mission utility, and a number of observers in recent years have proposed making changes to the composition of carrier air wings that are intended to increase their operating range.⁴³

East China Sea over the Senkakus," Project 2049, March 30, 2018, 32 pp.; Gordon G. Chang, "Top General Fears War With China and Russia at the Same Time," *Daily Beast*, October 31, 2018; James E. Fanell. "China's Global Naval Strategy and Expanding Force Structure," James E. Fanell, *Naval War College Review*, Winter 2019: 10-55.

⁴² CRS Report RL32418, *Navy Virginia (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress*, by Ronald O'Rourke.

⁴³ See, for example, Bryan Clark et al., *Regaining the High Ground at Sea: Transforming the U.S. Navy's Carrier Air Wing for Great Power Competition*, Center for Strategic and Budgetary Assessments, 2018, 142 pp.

Proposed changes include adding long-range unmanned combat air vehicles (UCAVs) to the air wing. The Navy's new carrier-based MQ-25 Stingray unmanned aerial vehicle (UAV) is intended to extend the operating range of carrier air wings by increasing the air wing's capability to perform in-flight refueling of its combat aircraft.

Statements from Navy officials reported in the press beginning in February 2019 indicate that the Navy is currently considering moving to a new aircraft carrier/naval aviation force architecture that might supplement today's large-deck nuclear-powered aircraft carriers (CVNs) with smaller and perhaps nonnuclear-powered aircraft carriers.⁴⁴ While the idea of procuring smaller and perhaps nonnuclear-powered aircraft carriers has been debated on and off for many years, discussion of the idea among Navy leaders may be more significant now than at any time since the Carter Administration. As noted earlier, OSD's study of future Navy force-level requirements reportedly recommends a fleet with nine aircraft carriers—two less than the current 11-carrier force, and three less than the 12-carrier force called for in the 355-ship plan.

Surface Combatants in the Navy's Future Force Structure

Volatility of Navy Planning for Surface Combatant Procurement and Force Management

Over the last quarter-century, the Navy has experienced considerable churn or volatility in its surface combatant procurement and force-management planning. Developments during this period include, among other things:

- the creation by the Navy, in conjunction with DARPA, of the arsenal ship program in 1996, followed by the cancellation of the program in 1997;⁴⁵
- the Navy's announcement in November 2001 that it was replacing a program for a planned new destroyer called the DD-21 with a new Future Surface Combatant Program aimed at developing and acquiring a family of three new classes of surface combatants, including a destroyer called DD(X) (later renamed DDG-1000), a cruiser called CG(X), and a smaller combatant called the Littoral Combat Ship (LCS);
- the Navy's decision in July 2008, after years of defending the DDG-1000 program, to truncate the DDG-1000 program and resume procurement of DDG-51s—a complete reversal of the Navy's plans for procuring destroyers;
- the termination in the Navy's FY2011 budget submission of CG(X) program;⁴⁶
- multiple changes to the LCS program, including a truncation of the program in December 2015 from a planned procurement total of 52 ships to a smaller number, to be followed by the procurement of new frigates (FFs);
- the subsequent evolution of the FF program into a program for procuring more-capable guided missile frigates (FFGs);

⁴⁴ For additional discussion, see **Appendix C** of this statement and also and CRS Report RS20643, *Navy Ford (CVN-78) Class Aircraft Carrier Program: Background and Issues for Congress*, by Ronald O'Rourke, and CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

⁴⁵ See archived CRS report 97-1004 F, *Navy/DARPA Maritime Fire Support Demonstrator (Arsenal Ship) Program: Issues Arising From Its Termination*, by Ronald O'Rourke. For additional background information on the arsenal ship program, see archived CRS Report 97-4556 F, *Navy/DARPA Arsenal Ship Program: Issues and Options for Congress*, by Ronald O'Rourke.

⁴⁶ See archived CRS report CRS Report RL34179, *Navy CG(X) Cruiser Program: Background for Congress*, by Ronald O'Rourke.

- the initiation of programs for developing and procuring Large USVs (LUSVs) and Medium USVs (MUSVs) that would operate in conjunction with manned Navy surface combatants;
- changes in Navy 30-year shipbuilding plans regarding when procurement of Flight III DDG-51s would end and procurement of a successor design would begin, and whether the successor design would be a Flight IV version of the DDG-51 or a different design; and
- proposed changes in Navy plans for modernizing and extending the service lives of some of its CG-47 cruisers.

Defenders of these developments might argue that they reflect a willingness by the Navy to adapt to a series of significant changes over this time period in strategic, technological, and budgetary circumstances. Skeptics might argue that they reflect an inadequate ability within the Navy to understand its requirements for surface combatants for conducting future missions and to define and justify surface combatant programs for providing capabilities needed for performing those missions.

Options for Augmenting Procurement of Smaller Surface Combatants

The Navy's current plans for procuring smaller surface combatants focus on the FFG(X) frigate program⁴⁷ and the LUSV and MUSV programs.⁴⁸ Compared to larger surface combatants, smaller surface combatants can have shorter construction times and might be suitable for construction in a larger number of U.S. shipyards. For both of these reasons, augmenting plans for procuring smaller surface combatants might offer more potential for changing Navy force structure in the shorter run than augmenting plans for procuring larger surface combatants. Augmenting plans for procuring smaller surface combatants might also be viewed as consistent with moving more quickly to a more-distributed fleet architecture. Potential options for augmenting plans for procuring smaller surface combatants include the following:

- Procuring more than the Navy's currently-planned total of 20 FFG(X)s;
- Building FFG(X)s at two or three shipyards at a combined annual procurement rate of four to six ships per year (rather than building them at a single shipyard at a rate of two ships per year, as the Navy currently plans), particularly if a total of more than 20 FFG(X)s were to be procured;
- Augmenting procurement of FFG(X)s, which will be fairly large (approximately 7,400-ton) frigates, with additional procurement of smaller (roughly 4,000- to 5,500-ton) frigates whose design might be derived from either
 - Huntington Ingalls Industries/Ingalls Shipbuilding's (HII/Ingalls') design for the Coast Guard National Security Cutter (NSC),⁴⁹

⁴⁷ For more on the FFG(X) program, see CRS Report R44972, *Navy Frigate (FFG[X]) Program: Background and Issues for Congress*, by Ronald O'Rourke.

⁴⁸ For more on the LUSV and MUSV programs, see CRS Report R45757, *Navy Large Unmanned Surface and Undersea Vehicles: Background and Issues for Congress*, by Ronald O'Rourke.

⁴⁹ HII/Ingalls has previously offered for potential foreign sales at least two designs for a Navy Patrol Frigate derived from the NSC design. See, for example, Calvin Biesecker, "HII Introduces Two NSC Variants For International Patrol Frigate Sales," *Defense Daily*, January 12, 2012; Ingalls Shipbuilding, "Ingalls Shipbuilding Highlighting Patrol Frigate Derivative of National Security Cutter at DIMDEX," Huntington Ingalls Industries, March 26, 2012; Zachary Howitt, "It's Time for a 'Sea-Control Frigate,'" *U.S. Naval Institute Proceedings*, April 2014; Mrityunjoy Mazumdar, "Patrol Frigate Concepts from Huntington Ingalls Industries Gain Traction Internationally," *Defense Media Network*, April 24, 2012; "Ingalls Shipbuilding Highlights its Patrol Frigate at Sea-Air-Space 2014," *Navy Recognition*, undated, ca. April 2014; Dave Majumdar, "Huntington Ingalls Has a

- Eastern Shipbuilding’s design for the first four Coast Guard Offshore Patrol Cutters (OPCs);
- General Dynamics/Bath Iron Works’ design for the original OPC competition,
- Bollinger Shipyards’ design for the original OPC competition,
- any new OPC designs that U.S. shipyards may develop for the follow-on competition for OPCs 5 through 15,⁵⁰ or
- a foreign frigate design in this general size range.
- Augmenting procurement of FFG(X)s and perhaps also 4,000- to 5,500-ton frigates with additional procurement of missile-armed corvettes with displacements of perhaps 1,000 tons to 4,000 tons whose design might be developed from scratch or derived from either
 - Fincantieri/Marine Marine’s LCS-1 design,
 - Austal USA’s LCS-2 design,
 - HII/Ingalls’ Sa’ar 5 corvette design (which HII/Ingalls built in the 1990s for Israel’s navy), or
 - a foreign corvette design.

In connection with the second option above, it can be noted that the Navy’s previous frigates—the Oliver Hazard Perry (FFG-7) class frigates—were built in three U.S. shipyards and procured at annual rates of up to eight ships per year.

Coordination with Coast Guard Shipbuilding

As can be seen from the above list of options, there is currently some potential, at least in theory, for coordinating procurement of smaller Navy surface combatants with procurement of Coast Guard cutters—something that might increase production economies of scale and help optimize the nation’s shipbuilding effort at the national level (rather than sub-optimize it at the individual service level).

Such coordination could be viewed as consistent with Navy-Coast Guard policy statements: On at least three occasions in recent years—in 2002, 2006, and 2013—Navy and Coast Guard leaders signed joint National Fleet Policy Statements to provide (as stated in the 2013 edition) “direction and guidance for our Services to achieve commonality and interoperability for 21st century maritime and naval operations.” The document states that “This Policy is particularly important in light of: significantly constrained fiscal resources; the growing costs of acquiring, training, and maintaining technologically advanced forces; and the complexity and lethality of national security threats and challenges confronting the Nation in and from the maritime domain.” It states further that “This Policy enables Navy and Coast Guard forces to effectively and efficiently support each other while identifying specific methods and measurements, avoid redundancies and achieve economies of scale to maximize our Nation’s investment of increasingly scarce

New Frigate that Could Give the U.S. Navy Some Impressive Capabilities,” *National Interest*, January 11 2017.

For more on the NSC program, see CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by Ronald O’Rourke.

⁵⁰ For more on the OPC program, see CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by Ronald O’Rourke.

resources.”⁵¹ The 2013 National Fleet Policy Statement was followed in 2015 by a joint Navy-Coast Guard National Fleet Plan for implementing the National Fleet Policy Statement.⁵²

Amphibious Ships in the Navy’s New Force Structure

The Navy’s envisioned program for procuring 28 to 30 new Light Amphibious Warships (LAWs) can be viewed as an initial action to begin shifting the Navy’s amphibious ships to a more-distributed force architecture. A key question is how many LHA/LHD-type large-deck amphibious assault ships and LPD-type amphibious ships would be included under a more-distributed amphibious ship force architecture.

Potential New Ways of Designing and Building Ships

With multiple new kinds of ships—including surface combatants, amphibious ships, logistics ships, and unmanned vehicles—now being designed and procured or potentially available for design and procurement, there might be an opportunity to examine new ways of building ships that might reduce ship design, procurement, and life-cycle O&S costs. U.S. naval architects and engineers are currently focusing on best practices used in South Korea and other Asian shipyards for designing and building warships, because in the view of these naval architects and engineers, “Asian navies are building larger warships that are easier to construct, easier to maintain, and that have greater service [life] allowances for future combat system upgrade. It is also reported that they are also doing this at significantly lower costs than US practice.”⁵³ In addition to adopting such practices, there may be potential for achieving increased production economies of scale in the procurement of U.S. Navy ships by making greater use of:

- cross-class commonalities in hull designs, hull sections, components, materials, and logistics support;
- shared modular production of individual ships, in which certain shipyards produce segments of individual ships that are then transported to a final-assembly yard—an approach that has been used in the Navy’s Virginia-class submarine and DDG-1000 destroyer programs, as well as for some LPD-17 class amphibious ships, and which could permit shipyards to participate in the construction of larger ships that these yards could not fully build by themselves;
- batch building of common hull sections for multiple ships of a given class (as opposed to pure serial building of individual ships);
- bundling shipbuilding programs into packages and competing them periodically, perhaps with Profit Related to Offer (PRO) bidding,⁵⁴ between multi-shipyard teams that might leverage commonality, shared modular production, and batch building; and

⁵¹ *The National Fleet, A Joint United States Navy and United States Coast Guard Policy Statement*, undated but issued in 2013, pp. 1, 3.

⁵² Department of the Navy, Office of the Chief of Naval Operations, and United States Coast Guard, Office of the Commandant, *The National Fleet Plan*, August 2015, 59 pp.

CBO examined the concept of combining Navy and Coast Guard small combatant procurement programs in a 2009 report, using Navy and Coast Guard programs of record of that time. (Congressional Budget Office, *Options for Combining the Navy’s and the Coast Guard’s Small Combatant Programs*, July 2009, 22 pp.) The combinations of Navy and Coast Guard programs suggested above would be somewhat different than those examined by CBO in its 2009 report.

⁵³ Peter E. Jaquith, “Asian vs. U.S. Warship Design, Production Engineering, and Construction Practice,” *Naval Engineers Journal*, December 2019: 55-58. See also Tony Jang, Lois Pena, and Nicholas Abbott, “Realizing Flexible Ships: Lessons from Allies to Improve the U.S. Shipbuilding Affordability, Capacity, and Schedule,” *Naval Engineers Journal*, December 2019: 59-71.

⁵⁴ Under PRO bidding, the bidder that submits the lower bid receives a higher profit margin. The approach is sometimes referred

- multiyear contracting (i.e., multiyear procurement [MYP] and block buy contracting).⁵⁵

Appendix C presents a general summary of lessons learned in Navy shipbuilding, reflecting comments made repeatedly by various sources over the years.

Chairman Courtney, 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.

to as competition for profit. For more on PRO bidding, see Statement of Ronald O'Rourke, Specialist in Naval Affairs, Congressional Research Service, before the House Armed Services Committee on Case Studies in DOD Acquisition: Finding What Works, June 24, 2014, p. 7.

⁵⁵ For more on MYP and block buy contracting, see CRS Report R41909, *Multiyear Procurement (MYP) and Block Buy Contracting in Defense Acquisition: Background and Issues for Congress*, by Ronald O'Rourke.

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, with concentrations in international relations theory, international law, and international economics.

Since 1984, Mr. O'Rourke has worked as analyst and specialist in naval affairs for CRS. He has written many CRS 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, Arctic, and strategy issues to a variety of U.S. and international audiences in government, industry, and academia.

Appendix B. FY2021 Budget's Treatment of CVN-81, LPD-31, and LHA-9 Procurement Dates

Overview

A potentially significant institutional issue for Congress concerns the treatment in the Navy's proposed FY2021 budget of the procurement dates of the aircraft carrier CVN-81 and the amphibious ships LPD-31 and LHA-9.

The Navy's FY2021 budget submission presents the aircraft carrier CVN-81 as a ship that Congress procured in FY2020, rather than a ship that Congress procured (i.e., authorized and provided procurement funding for) in FY2019. The Navy's FY2021 budget submission presents LPD-31, an LPD-17 Flight II amphibious ship, as a ship requested for procurement in FY2021, rather than a ship that Congress procured in FY2020, and the amphibious assault ship LHA-9 as a ship projected for procurement in FY2023, rather than a ship that Congress procured in FY2020.

Potential oversight issues for Congress include the following:

- By presenting CVN-81 as a ship that was procured in FY2020 (instead of a ship that was procured in FY2019), LPD-31 as a ship requested for procurement in FY2021 (instead of a ship that was procured in FY2020), and LHA-9 as a ship projected for procurement in FY2023 (instead of a ship that was procured in FY2020), is DOD, in its FY2021 budget submission, disregarding or mischaracterizing the actions of Congress regarding the procurement dates of these three ships? If so:
 - Is DOD doing this to inflate the apparent number of ships requested for procurement in FY2021 and the apparent number of ships included in the five-year shipbuilding plan?
 - Could this establish a precedent for DOD in the future to ignore or mischaracterize the actions of Congress regarding the procurement or program-initiation dates for other Navy ships, other Navy programs, other DOD programs, or other federal programs? If so, what implications might that have for the preservation of Congress's power of the purse and its status as a branch of government relative to the executive branch?

CVN-81 Aircraft Carrier

The Navy's FY2020 budget submission presented the aircraft carrier CVN-81 as a ship requested for procurement in FY2020, and the Navy's FY2021 budget submission presents CVN-81 as a ship that Congress procured in FY2020. Congressional action on the Navy's FY2019 budget shows CVN-81 as a ship that Congress procured in FY2019:

- Within Section 121 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (H.R. 5515/P.L. 115-232 of August 13, 2018)—the provision that authorized a two-ship block buy contract for CVN-80 and CVN-81—subsection (a)(1) specifically authorizes a contract for the procurement of CVN-81 “beginning with the fiscal year 2019 program year.” The header for subsection (a)(1) is “Procurement Authorized.”
- Consistent with Section 121(a)(1), the funding table for the Navy's shipbuilding account in the conference report (H.Rept. 115-874 of July 25, 2018) on H.R. 5515 shows a quantity of “1” in line 002 of the FY2019 SCN (Shipbuilding and Conversion, Navy)

appropriation account. Line 002 is the line item for procurement (not advance procurement [AP]) funding for the CVN-78 program. A notation in the table for line 002 states that the procurement funding authorized for this line item is for “Authorize CVN81—One ship.”⁵⁶ The funding table does not authorize any funding for line 003 of the FY2019 SCN account—the line item for AP funding for the CVN-78 program. (AP funding is funding for the procurement of a ship to be procured in a future fiscal year.)

- Consistent with the two above points, the paragraph in the FY2019 DOD appropriations act (Division A of H.R. 6157/P.L. 115-245 of September 28, 2018) that makes appropriations for the SCN account makes procurement (not AP) appropriations for the CVN-78 program. This paragraph also states that “the funds made available by this Act for the Carrier Replacement Program (CVN-80) may be available to modify or enter into a new contract for the procurement of a Ford-class aircraft carrier designated CVN–81 pursuant to section 121 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019.”
- Consistent with this bill language, the funding table for the SCN account in the joint explanatory statement for H.R. 6157 shows that this funding was provided for line 2 of the FY2019 SCN account (CVN-78 program procurement funding), not line 3 of the FY2019 SCN account (CVN-78 program AP funding).⁵⁷
- Consistent with all of the above points, the Navy’s FY2020 budget submission shows the \$618 million in FY2019 funding for CVN-81 as full funding (meaning funding for a procured ship), rather than AP funding (meaning funding for a ship to be procured in a future fiscal year).⁵⁸
- The House Armed Services Committee’s report (H.Rept. 116-120 of June 19, 2019) on H.R. 2500, the FY2020 National Defense Authorization Act, recommended authorizing the procurement of no aircraft carrier in FY2020 due to “CVN–81 previously authorized.”⁵⁹
- The Senate Armed Services Committee’s report (S.Rept. 116-48 of June 11, 2019) on S. 1790, the FY2020 National Defense Authorization Act, recommended authorizing the procurement of no aircraft carrier in FY2020 due to “CVN-81 authorized in NDAA [FY]2019.”⁶⁰
- The conference report (H.Rept. 116-333 of December 9, 2019) on S. 1790/P.L. 116-92 of December 20, 2019, the FY2020 National Defense Authorization Act, authorized the procurement of no aircraft carrier in FY2020 due to “CVN–81 previously authorized.”⁶¹
- The House Appropriations Committee’s report (H.Rept. 116-84 of May 23, 2019) on H.R. 2968, the FY2020 DOD Appropriations Act, adjusted the Navy’s FY2020 budget submission to show that no aircraft carrier was being requested for procurement in FY2020.⁶²

⁵⁶ H.Rept. 115-874, p. 1164.

⁵⁷ Joint explanatory statement for H.R. 6157, PDF pages 174 and 176 of 559.

⁵⁸ *Department of Defense, Fiscal Year (FY) 2020 President’s Budget Estimate Submission, Navy, Justification Book Volume 1 of 1, Shipbuilding and Conversion, Navy*, March 2019, p. 15 (PDF page 51 of 356).

⁵⁹ H.Rept. 116-120, p. 378, line 002.

⁶⁰ S.Rept. 116-48, p. 432, line 2.

⁶¹ H.Rept. 116-333, p. 1565, line 002.

⁶² H.Rept. 116-84, p. 173, line 2.

- The Senate Appropriations Committee’s report (S.Rept. 116-103 of September 12, 2019) on S. 2474, the FY2020 DOD Appropriations Act, adjusted the Navy’s FY2020 budget submission to show that no aircraft carrier was being requested for procurement in FY2020.⁶³

LPD-31—an LPD-17 Flight II Amphibious Ship

The Navy’s FY2021 budget submission presents LPD-31, an LPD-17 Flight II amphibious ship, as a ship requested for procurement in FY2021. Congressional action on the Navy’s FY2020 budget shows LPD-31 as a ship that Congress procured in FY2020:

- The House Armed Services Committee’s report (H.Rept. 116-120 of June 19, 2019) on H.R. 2500, the FY2020 National Defense Authorization Act, recommended authorizing the procurement of an LPD-17 Flight II ship in FY2020, showing a quantity increase of one ship above the Navy’s request and recommending procurement (not just AP) funding for the program.⁶⁴
- The Senate Armed Services Committee’s report (S.Rept. 116-48 of June 11, 2019) on S. 1790, the FY2020 National Defense Authorization Act, recommended authorizing the procurement of an LPD-17 Flight II ship in FY2020, showing a quantity increase of one ship above the Navy’s request and recommending procurement (rather than AP) funding for the program.⁶⁵
- The conference report (H.Rept. 116-333 of December 9, 2019) on S. 1790/P.L. 116-92 of December 20, 2019, the FY2020 National Defense Authorization Act, authorized the procurement of an LPD-17 Flight II ship in FY2020, showing a quantity increase of one ship above the Navy’s request and recommending procurement (rather than AP) funding for the program.⁶⁶ Section 129 of S. 1790/P.L. 116-92 authorizes the Navy to enter into a contract, beginning in FY2020, for the procurement of LPD-31, and to use incremental funding to fund the contract.
- The Senate Appropriations Committee’s report (S.Rept. 116-103 of September 12, 2019) on S. 2474, the FY2020 DOD Appropriations Act, recommended funding for the procurement of an LPD-17 Flight II ship in FY2020, showing a quantity increase of one ship above the Navy’s request and recommending procurement (rather than AP) funding for the program.⁶⁷
- The final version of the FY2020 DOD Appropriations Act (Division A of H.R. 1158/P.L. 116-93 of December 20, 2019) provides procurement (not AP) funding for an LPD-17 Flight II ship. The paragraph in this act that appropriates funding for the Navy’s shipbuilding account, including this ship, includes a provision stating “*Provided further*, That an appropriation made under the heading ‘Shipbuilding and Conversion, Navy’ provided for the purpose of ‘Program increase—advance procurement for fiscal year 2020 LPD Flight II and/or multiyear procurement economic order quantity’ shall be considered to be for the purpose of ‘Program increase—advance procurement of LPD–31’.” This provision relates to funding appropriated in the FY2019 DOD Appropriations

⁶³ S.Rept. 116-103, p. 118, line XX.

⁶⁴ H.Rept. 116-120, p. 379, line 012.

⁶⁵ S.Rept. 116-48, p. 433, line 12. See also pp. 23-24 for associated report language.

⁶⁶ H.Rept. 116-333, p. 1566, line 012. See also p. 1144 for associated report language.

⁶⁷ S.Rept. 116-103, p. 118, line 12. See also p. 122 for associated report language.

Act (Division A of H.R. 6157/P.L. 115-245 of September 28, 2018) for the procurement of an LPD-17 Flight II ship in FY2020, as originally characterized in the explanatory statement accompanying that act.⁶⁸

LHA-9 Amphibious Assault Ship

The Navy's FY2021 budget submission presents the amphibious assault ship LHA-9 as a ship projected for procurement in FY2023. Congressional action on the Navy's FY2020 budget shows LHA-9 as a ship that Congress procured in FY2020:

- The Senate Armed Services Committee's report (S.Rept. 116-48 of June 11, 2019) on S. 1790, the FY2020 National Defense Authorization Act, recommended authorizing the procurement of LHA-9 in FY2020, showing a quantity increase of one ship above the Navy's request and recommending procurement (rather than AP) funding for the program.⁶⁹
- The conference report (H.Rept. 116-333 of December 9, 2019) on S. 1790/P.L. 116-92 of December 20, 2019, the FY2020 National Defense Authorization Act, authorized the procurement of LHA-9 in FY2020, showing a quantity increase of one ship above the Navy's request and recommending procurement (rather than AP) funding for the program.⁷⁰ Section 127 of S. 1790/P.L. 116-92 authorizes the Navy to enter into a contract for the procurement of LHA-9 and to use incremental funding provided during the period FY2019-FY2025 to fund the contract.
- The Senate Appropriations Committee's report (S.Rept. 116-103 of September 12, 2019) on S. 2474, the FY2020 DOD Appropriations Act, recommended funding for the procurement of an LHA amphibious assault ship in FY2020, showing a quantity increase of one ship above the Navy's request and recommending procurement (rather than AP) funding for the program.⁷¹
- The final version of the FY2020 DOD Appropriations Act (Division A of H.R. 1158/P.L. 116-93 of December 20, 2019) provides procurement (not AP) funding for an LHA amphibious assault ship. The explanatory statement for Division A of H.R. 1158/P.L. 116-93 states that the funding is for LHA-9.⁷²

⁶⁸ See PDF page 176 of 559, line 12, of the explanatory statement for H.R. 6157/P.L. 115-245.

⁶⁹ S.Rept. 116-48, p. 433, line 15.

⁷⁰ H.Rept. 116-333, p. 1566, line 015.

⁷¹ S.Rept. 116-103, p. 118, line 15.

⁷² Explanatory statement for Division A of H.R. 1158, PDF page 175 of 414, line 15.

Appendix C. Reported Potential Changes in Fleet Architecture Associated with INFSA

This appendix provides additional details on reported potential changes in fleet architecture that could be reflected in the INFSA.

Potential New Surface Combatant Force Architecture

Statements from Navy officials suggest that the INFSA might shift the Navy's surface combatant force to a more distributed architecture that includes a reduced proportion of large surface combatants (i.e., cruisers and destroyers), an increased proportion of small surface combatants (i.e., frigates and LCSs), and a newly created third tier of unmanned surface vehicles (USVs).

Figure 1 provides, for the surface combatant portion of the Navy,⁷³ a conceptual comparison of the current fleet architecture (shown on the left as the “ship centric force”) and the new, more distributed architecture (shown on the right as the “distributed/nodal force”). The figure does not depict the entire surface combatant fleet, but rather a representative portion of it.

In the figure, each sphere represents a manned ship or USV. As shown in the color coding, under both the current fleet architecture and the more distributed architecture, the manned ships (i.e., the LSCs and SSCs) are equipped with a combination of sensors (green), command and control (C2) equipment (red), and payloads other than sensors and C2 equipment, meaning principally weapons (blue).

Under the more distributed architecture, the manned ships would be on average smaller (because a greater share of them would be SSCs), and this would be possible because some of the surface combatant force's weapons and sensors would be shifted from the manned ships to USVs, with weapon-equipped Large USVs (LUSVs) acting primarily as adjunct weapon magazines and sensor-equipped Medium USVs (MUSVs) contributing to the fleet's sensor network.

As shown in **Figure 1**, under the Navy's current surface combatant force architecture, there are to be 20 LSCs for every 10 SSCs (i.e., a 2:1 ratio of LSCs to SSCs), with no significant contribution from LUSVs and MUSVs. This is consistent with the Navy's current force-level objective, which calls for achieving a 355-ship fleet that includes 104 LSCs and 52 SSCs (a 2:1 ratio). Under the more distributed architecture, the ratio of LSCs to SSCs would be reversed, with 10 LSCs for every 20 SSCs (a 1:2 ratio), and there would also now be 30 LUSVs and 40 MUSVs.

A January 15, 2019, press report states

The Navy plans to spend this year taking the first few steps into a markedly different future, which, if it comes to pass, will upend how the fleet has fought since the Cold War. And it all starts with something that might seem counterintuitive: It's looking to get smaller.

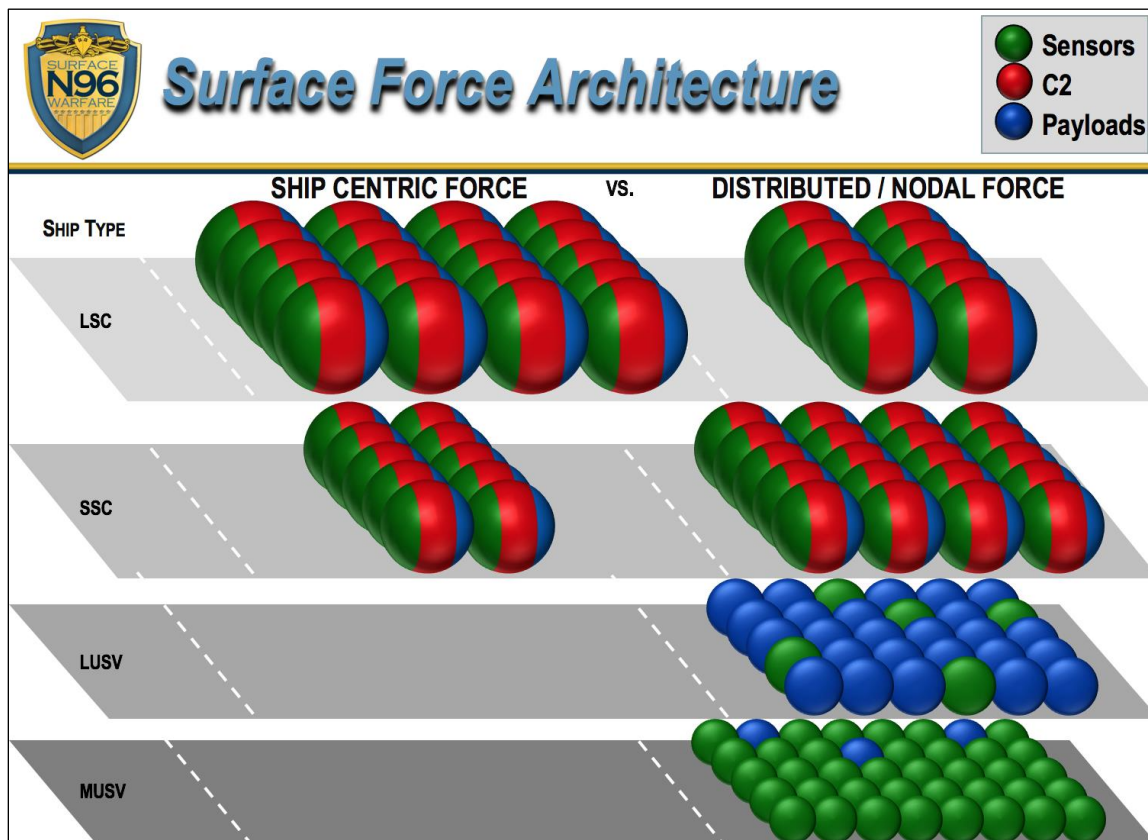
“Today, I have a requirement for 104 large surface combatants in the force structure assessment; [and] I have [a requirement for] 52 small surface combatants,” said Surface Warfare Director Rear Adm. Ronald Boxall. “That's a little upside down. Should I push out here and have more small platforms? I think the future fleet architecture study has intimated ‘yes,’ and our war gaming shows there is value in that.”⁷⁴

⁷³ Other major parts of the Navy include submarines, aircraft carriers, amphibious ships, logistics (resupply) ships, and support ships.

⁷⁴ David B. Larer, “US Navy Moves Toward Unleashing Killer Robot Ships on the World's Oceans,” *Defense News*, January 15, 2019.

Figure 1. Navy Briefing Slide on Surface Combatant Force Architecture

Each sphere represents a ship or unmanned surface vehicle (USV)



Source: Illustration accompanying Megan Eckstein, "Sea Hunter Unmanned Ship Continues Autonomy Testing as NAVSEA Moves Forward with Draft RFP," *USNI News*, April 29, 2019. The illustration was also included as Slide 2 in a Navy briefing entitled "Designing & Building the Surface Fleet: Unmanned and Small Combatants," by Rear Admiral Casey Moton at a June 20, 2019, conference of the American Society of Naval Engineers (ASNE).

Notes: Each sphere represents a ship or a USV. LSC means large surface combatant (i.e., cruiser or destroyer), and SSC means small surface combatant (i.e., frigate or LCS). As shown in the color coding, the LSCs and SSCs are equipped with a combination of sensors (green), command and control (C2) equipment (red), and payloads other than sensors and C2 equipment, meaning principally weapons (blue). LUSVs and MUSVs, in contrast, are equipped primarily with weapons (blue) or sensors (green).

Another way of summarizing **Figure 1** would be to say that the surface combatant force architecture (reading vertically down the figure) would change from 20+10+0+0 (i.e., a total of 30 surface combatant platforms, all manned, and a platform ratio of 2-1-0-0) for a given portion of the surface combatant force, to 10+20+30+40 (i.e., a total of 100 surface combatant platforms, 70 of which would be LUSVs and MUSVs, and a platform ratio of 1-2-3-4) for a given portion of the surface combatant force. The Navy refers to the more distributed architecture's combination of LSCs, SSCs, LUSVs, and MUSVs as the Future Surface Combatant Force (FSCF).

Figure 1 is conceptual, so the platform ratios for the more distributed architecture should be understood as notional or approximate rather than exact. The point of the figure is not that relative platform numbers

under the more distributed architecture would change to the exact ratios shown in the figure, but that they would evolve over time toward something broadly resembling those ratios.⁷⁵

A January 23, 2020, press report states that

The Navy is expected to finalize next month a major new analysis of its future surface combatant fleet....

The findings are expected to influence force structure decisions in fiscal year 2021 as well as budget and shipbuilding plans beginning in FY-22.

The Future Surface Combatant Force analysis of alternatives [AOA], a 16-month effort, will provide a key input into the Navy's Integrated Force Structure Assessment....

The AOA, according to a senior official, validated a key Navy hypothesis posed in 2018, that a fleet of unmanned surface vessels packed with sensors or loads of missiles give U.S. commanders more options and complicate the calculus for an adversary.⁷⁶

Potential New Amphibious Ship Architecture

Statements from the Commandant of the Marine Corps suggest strongly that the INFSA might change the Navy's amphibious ship force to an architecture based on a new amphibious lift target and a new mix of amphibious ships.

The current 38-ship amphibious ship force-level goal is intended to meet a requirement for having enough amphibious lift to lift the assault echelons of two Marine Expeditionary Brigades (MEBs), a requirement known as the 2.0 MEB lift requirement. The 2.0 MEB lift requirement dates to 2006. The translation of this lift requirement into a Marine Corps-preferred force-level goal of 38 ships dates to 2009, and the Navy's formal incorporation of the 38-ship goal (rather than a more fiscally constrained goal of 33 or 34 ships) into the Navy's overall ship force-structure goal dates to the 2016 FSA.⁷⁷

In July 2019, General David H. Berger, the Commandant of the Marine Corps, released a document entitled *Commandant's Planning Guidance* that states that the Marine Corps wants to, among other things, move away from the 38-ship amphibious ship force-level goal and the 2.0 MEB lift force-planning metric, and shift to a new and different mix of amphibious ships that includes not only the LHA/LHD-type amphibious assault ships and LPD/LPD-type amphibious ships called for in the 2016 FSA, but other kinds of ships as well, including smaller amphibious ships, ships like the Navy's Expeditionary Sea Base (ESB) and Expeditionary Fast Transport (EPF) ships (referred to collectively as E-class ships), ships based on commercial-ship hull designs, and unmanned surface vehicles (USVs).⁷⁸

⁷⁵ For further discussion, see CRS Report RL32109, *Navy DDG-51 and DDG-1000 Destroyer Programs: Background and Issues for Congress*, by Ronald O'Rourke, CRS Report R44972, *Navy Frigate (FFG[X]) Program: Background and Issues for Congress*, by Ronald O'Rourke, and CRS Report R45757, *Navy Large Unmanned Surface and Undersea Vehicles: Background and Issues for Congress*, by Ronald O'Rourke.

⁷⁶ Jason Sherman, "New Future Surface Combatant Fleet Analysis Validates Contribution of Medium, Large USVs to Fight," *Inside Defense*, January 22, 2020.

⁷⁷ For additional discussion of the 2.0 MEB lift goal and earlier amphibious lift goals dating back to 1980, see Appendix A of CRS Report RL34476, *Navy LPD-17 Amphibious Ship Procurement: Background, Issues, and Options for Congress*, by Ronald O'Rourke.

⁷⁸ U.S. Marine Corps, *Commandant's Planning Guidance*, 38th Commandant of the Marine Corps, undated, released July 2019, pp. 4-5, 10. See also CRS Report R46374, *Navy Light Amphibious Warship (LAW) Program: Background and Issues for Congress*, by Ronald O'Rourke. See also Megan Eckstein, "New Commandant Berger Sheds 38-Amphib Requirement in Quest to Modernize USMC for High-End Fight," *USNI News*, July 18, 2019; Paul McLeary, "Sacred Cows Die As Marine Commandant Changes Course On Amphibs," *Breaking Defense*, July 26, 2019; David Ignatius, "The Marines' New Commandant Has Set the Bar for Real Military Reform," *Washington Post*, August 8, 2019; Megan Eckstein, "Marine Planners

Consistent with the *Commandant's Planning Guidance*, the Navy and Marine Corps now envision procuring a class of 28 to 30 smaller amphibious ships called Light Amphibious Ships (LAWs).⁷⁹

Potential New Aircraft Carrier/Naval Aviation Force Architecture

Statements from Navy officials reported in the press beginning in February 2019 indicate that the Navy is currently considering moving to a new aircraft carrier/naval aviation force architecture that might supplement today's CVNs with smaller and perhaps nonnuclear-powered aircraft carriers.⁸⁰

According to these press reports, one option for a smaller carrier is the so-called Lightning Carrier, a term referring to an LHA-type amphibious assault ship equipped with an air wing consisting largely of F-35B Joint Strike Fighter (JSFs). (The alternate name for the F-35 is the Lightning II. The B variant of the F-35, which is currently being procured for the Marine Corps, is short takeoff, vertical landing [STOVL] variant that can be operated off of ships with flight decks that are shorter than the flight decks of CVNs.) The Navy and Marine Corps have conducted experiments with the Lightning Carrier concept.⁸¹

Another option for a smaller carrier is one whose air wing would consist mostly or entirely of unmanned aerial vehicles (UAVs). The Navy in recent years has periodically studied the potential of UAV carriers.

The current discussion both inside and outside the Navy over the aircraft carrier to be procured after CVN-81 appears to reflect several considerations, including the following:

- concerns over China's improving capabilities for detecting surface ships and attacking them with anti-ship ballistic missiles (ASBMs) and advanced anti-ship cruise missiles (ASCMs);
- the procurement and operating and support (O&S) costs of CVNs and their air wings, particularly in a context of constraints on Navy funding and funding demands from other competing Navy programs; and

Using Commandant's Guidance to Start Crafting Future of the Corps," *USNI News*, September 18, 2019; Shawn Snow, "An Unmanned Ship That Can Travel 500 Nautical Miles Without Resupply—the Corps Is Looking at It," *Marine Corps Times*, September 19, 2019; Megan Eckstein, "Marines, Navy Both Considering Something Like an Offshore Support Vessel to Supplement Amphibs," *USNI News*, September 20, 2019; David Axe, "U.S. Navy and Marine Corps Want Small Ships to Land Troops in a War," *National Interest*, September 21, 2019; Megan Eckstein, "Navy, Marines Rethinking How to Build Future Fleet with Unmanned, Expeditionary Ships," *USNI News*, September 26, 2019; David Barno and Nora Bensahel, "A Striking New Vision for the marines, and a Wakeup Call for the Other Services," *War on the Rocks*, October 1, 2019; Megan Eckstein, "Berger: Marine 2030 Force Design Is Nearly Complete; Concepts Now Being Modeled, Tested," *USNI News*, October 3, 2019; Patrick Tucker, "The Future of the Marines Is Smaller, More Robotic, More Naval," *Defense One*, October 3, 2019; Otto Kreisher, "'Great Power' Fight Might Require Different Blend of Vessels, But Marines Won't Shun Amphibious Operations, NDIA Speakers Say," *Seapower*, October 24, 2019; Megan Eckstein, "Marines, Navy Considering 'Alternate' Amphibs to Supplement Today's Fleet," *USNI News*, October 26, 2019.

⁷⁹ For further discussion, see CRS Report R46374, *Navy Light Amphibious Warship (LAW) Program: Background and Issues for Congress*, by Ronald O'Rourke.

⁸⁰ See Rich Abott, "Navy Starts Looking At Carriers After CVN-81," *Defense Daily*, February 15, 2019; Richard R. Burges, "Secretary: Navy Discussing Next-Gen Carrier Concepts, Including 'Lightning Carrier,'" *Seapower*, October 24, 2019; Wesley Morgan, "Navy Secretary Accuses Congressional Critics of 'Disinformation' on Ford Carrier," *Politico Pro*, October 23, 2019; Otto Kreisher, "Spencer Lauds Tight Integration of Navy, Marine Forces in 'Great Power Competition,'" *Seapower*, October 27, 2019; Sam LaGrone, "Navy Still Mulling Post-F-35C Aviation Combatant; Could be Mix of Manned, Unmanned Aircraft," *USNI News*, December 5, 2019; Gina Hawkins, "Acting SecNav Hints at Fewer Aircraft Carriers in Next Ship-Count Plan," *Military.com*, January 29, 2020; Sam LaGrone, "Future of U.S. Carrier Fleet Key Issue as New Force Structure Moves Through Pentagon," *USNI News*, January 29, 2020; Rich Abott, "Modly: Future Carrier Force Unclear, All Options On The Table," *Defense Daily*, January 30, 2020.

⁸¹ See, for example, Megan Eckstein, "Marines Test 'Lightning Carrier' Concept, Control 13 F-35Bs from Multiple Amphibs," *USNI News*, October 23, 2019.

- the potential capabilities of smaller carriers operating air wings consisting of unmanned aerial vehicles (UAVs) and/or F-35B Joint Strike Fighters (i.e., the short-takeoff, vertical landing [STOVL] version of the F-35 now being procured for the Marine Corps).

Potential New Combat Logistics Force (CLF) Architecture

The Navy's FY2020 30-year shipbuilding plan suggests that shifting to a more distributed fleet architecture could increase required numbers of Combat Logistics Force (CLF) ships—meaning the oilers, ammunition ships, and dry cargo ships that transport fuel, ammunition, and supplies Navy combat ships that are operating at sea—and augment today's CLF ships with additional “smaller, faster, multi-mission transports.”⁸²

Potential New Undersea Force Architecture

Navy plans indicate that the Navy wants to change the Navy's undersea force to a more distributed architecture that includes, in addition to SSNs and bottom-based sensors, a new element of extra-large unmanned underwater vehicles (XLUUVs), which might be thought of as unmanned submarines.

⁸² U.S. Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, pp. 7, 15, 17, 24. The quoted phrase is from page 24.

Appendix D. A Summary of Some Acquisition Lessons Learned for Navy Shipbuilding

This appendix presents a general summary of lessons learned in Navy shipbuilding, reflecting comments made repeatedly by various sources over the years. 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%-to-80% solution (i.e., a design that is intended to provide 70%-80% 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.
- **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.

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