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Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress

March 20, 2020

Congressional Research Service
https://crsreports.congress.gov
RL32665

CRS REPORT
Prepared for Members and
Committees of Congress

Summary

In December 2016, the Navy released a force-structure goal that calls for achieving and maintaining a fleet of 355 ships of certain types and numbers. The 355-ship goal was made U.S. policy by Section 1025 of the FY2018 National Defense Authorization Act (H.R. 2810/P.L. 115-91 of December 12, 2017). The Trump Administration has identified the achievement of a Navy of 355 or more ships within 10 years as a high priority. The Navy states that it is working as well as it can, within a Navy budget top line that is essentially flat in real (i.e., inflation-adjusted terms), toward achieving that goal while also adequately funding other Navy priorities, such as restoring eroded ship readiness and improving fleet lethality. Navy officials state that while the 355-ship goal is a priority, they want to avoid creating a so-called hollow force, meaning a Navy that has an adequate number of ships but is unable to properly crew, arm, operate, and maintain those ships.

The Navy states that its proposed FY2021 budget requests the procurement of eight new ships, but this figure includes LPD-31, an LPD-17 Flight II amphibious ship that Congress procured (i.e., authorized and appropriated procurement funding for) in FY2020. Excluding this ship, the Navy's proposed FY2021 budget requests the procurement of seven new ships rather than eight.

A figure of 7 new ships is less than the 11 that the Navy requested for FY2020 (a figure that excludes CVN-81, an aircraft carrier that Congress authorized in FY2019) or the 13 that Congress procured in FY2020 (a figure that again excludes CVN-81, but includes the above-mentioned LPD-31 as well as an LHA amphibious assault ship that Congress also procured in FY2020). The figure of 7 new ships is also less than the 10 ships that the Navy projected under its FY2020 budget submission that it would request for FY2021, and less than the average ship procurement rate that would be needed over the long run, given current ship service lives, to achieve and maintain a 355-ship fleet.

In dollar terms, the Navy is requesting a total of about $19.9 billion for its shipbuilding account for FY2021. This is about $3.9 billion (16.3 %) less than the Navy requested for the account for FY2020, about $4.1 billion (17.0%) less than Congress provided for the account for FY2020, and about $3.6 billion (15.3%) less than the $23.5 billion that the Navy projected under its FY2020 budget submission that it would request for the account for FY2021.

The Navy states that its FY2021 five-year (FY2021-FY2025) shipbuilding plan includes 44 new ships, but this figure includes the above-mentioned LPD-31 and LHA amphibious ships that Congress procured in FY2020. Excluding these two ships, the Navy's FY2021 five-year shipbuilding plan includes 42 new ships, which is 13 less than the 55 that were included in the FY2020 (FY2020-FY2024) five-year plan and 12 less than the 54 that were projected for the period FY2021-FY2025 under the Navy's FY2020 30-year shipbuilding plan.

The Navy's 355-ship force-level goal is the result of a Force Structure Assessment (FSA) conducted by the Navy in 2016. A new FSA, referred to as the Integrated Naval FSA (INFSA), is to be published sometime during the spring of 2020. Statements from Department of the Navy (DON) officials suggest 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. 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 the mix of ships to be procured for the Navy and the distribution of Navy shipbuilding work among the nation's shipyards.

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Introduction

This report presents background information and issues for Congress concerning the Navy's force structure and shipbuilding plans. The current and planned size and composition of the Navy, the annual rate of Navy ship procurement, the capacity of the naval shipbuilding industry, and the prospective affordability of the Navy's shipbuilding plans have been oversight matters for the congressional defense committees for many years.

The Navy states that its proposed FY2021 budget requests the procurement of eight new ships, but this figure includes LPD-31, an LPD-17 Flight II amphibious ship that Congress procured (i.e., authorized and appropriated procurement funding for) in FY2020. Excluding this ship, the Navy's proposed FY2021 budget requests the procurement of seven new ships rather than eight, including one Columbia-class ballistic missile submarine (SSBN), one Virginia-class attack submarine (SSN), two DDG-51 destroyers, one FFG(X) frigate, and two TATS towing, salvage, and recue ships.

The issue for Congress is whether to approve, reject, or modify the Navy's proposed FY2021 shipbuilding program and the Navy's longer-term shipbuilding plans. Decisions that Congress makes on this issue can substantially affect Navy capabilities and funding requirements, and the U.S. shipbuilding industrial base.

Detailed coverage of certain individual Navy shipbuilding programs can be found in the following CRS reports:

- CRS Report R41129, *Navy Columbia (SSBN-826) Class Ballistic Missile Submarine Program: Background and Issues for Congress*, by Ronald O'Rourke.
- CRS Report RL32418, *Navy Virginia (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress*, by Ronald O'Rourke.
- CRS Report RS20643, *Navy Ford (CVN-78) Class Aircraft Carrier Program: Background and Issues for Congress*, by Ronald O'Rourke. (This report also covers the issue of the Administration's FY2020 budget proposal, which the Administration withdrew on April 30, to not fund a mid-life refueling overhaul [called a refueling complex overhaul, or RCOH] for the aircraft carrier *Harry S. Truman* [CVN-75], and to retire CVN-75 around FY2024.)
- 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.
- CRS Report R43543, *Navy LPD-17 Flight II and LHA Amphibious Ship Programs: Background and Issues for Congress*, by Ronald O'Rourke.
- CRS Report R43546, *Navy John Lewis (TAO-205) Class Oiler Shipbuilding Program: Background and Issues for Congress*, by Ronald O'Rourke.
- CRS Report R45757, *Navy Large Unmanned Surface and Undersea Vehicles: Background and Issues for Congress*, by Ronald O'Rourke.

For a discussion of the strategic and budgetary context in which U.S. Navy force structure and shipbuilding plans may be considered, see **Appendix A**.

Background

Navy's 355-Ship Ship Force-Structure Goal

Introduction

On December 15, 2016, the Navy released a force-structure goal that calls for achieving and maintaining a fleet of 355 ships of certain types and numbers.[1] The force level of 355 ships is a goal to be attained in the future; the actual size of the Navy in recent years has generally been between 270 and 300 ships. **Table 1** shows the composition of the 355-ship force-level objective.

Table 1. 355-Ship Force-Level Goal

Ship Category	Number of ships
Ballistic missile submarines (SSBNs)	12
Attack submarines (SSNs)	66
Aircraft carriers (CVNs)	12
Large surface combatants (i.e., cruisers [CGs] and destroyers [DDGs])	104
Small surface combatants (i.e., frigates [FFGs], Littoral Combat Ships, and mine warfare ships)	52
Amphibious ships	38
Combat Logistics Force (CLF) ships (i.e., at-sea resupply ships)	32
Command and support ships	39
TOTAL	**355**

Source: U.S. Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, Table A-1 on page 10.

355-Ship Goal Resulted from 2016 Force Structure Assessment (FSA)

The 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 (CCDRs) 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.[2]

Although the result of the FSA is often reduced for convenience to 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 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. 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.

[1] For previous Navy force-level goals, see **Appendix B**.

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

355-Ship Goal Made U.S. Policy by FY2018 NDAA

Section 1025 of the FY2018 National Defense Authorization Act, or NDAA (H.R. 2810/P.L. 115-91 of December 12, 2017), states the following:

> 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.[3]

355-Ship Goal Is an Administration Priority

The Trump Administration has identified the achievement of a Navy of 355 or more ships within 10 years as a high priority. The Navy states that it is working as well as it can, within a Navy budget top line that is essentially flat in real (i.e., inflation-adjusted terms), toward achieving that goal while also adequately funding other Navy priorities, such as restoring eroded ship readiness and improving fleet lethality. Navy officials state that while the 355-ship goal is a priority, they want to avoid creating a so-called hollow force, meaning a Navy that has an adequate number of ships but is unable to properly crew, arm, operate, and maintain those ships.

Large Unmanned Vehicles and Navy Ship Count

Because large unmanned surface and underwater vehicles now being developed by the Navy could be deployed directly from pier (rather than from a manned Navy ship) to perform missions that might otherwise be assigned to manned ships and submarines, some observers raised a question as to whether the large UVs unmanned surface and underwater vehicles should be included in the top-level count of the number of ships in the Navy.

In December 2019, it was reported that the Office of Management and Budget (OMB) had directed the Navy to include in its FY2021 budget submission a legislative proposal to formally change the definition of which ships count toward the quoted size of the Navy (known as the number of battle force ships) to include not only manned ships, but also large UVs that operate essentially as unmanned ships.[4] In January 2020, however, Admiral Michael Gilday, the Chief of Naval Operations, stated that the top-level expression of the ship force-level goal resulting from the Navy's next FSA (discussed later in this report), will not include UVs.[5]

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[3] 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).

[4] See Justin Katz, "OMB: Pentagon Must Submit Proposal to 'Redefine' Battleforce Ships to Include Unmanned Vehicles," *Inside Defense*, December 20, 2019; Joseph Trevithick, "White House Asks Navy To Include New Unmanned Vessels In Its Ambitious 355 Ship Fleet Plan," *The Drive*, December 20, 2019; Paul McCleary, "Navy To Slash 24 Ships in 2021 Plan, Bolster Unmanned Effort," *Breaking Defense*, December 20, 2019, David B. Larter, "Pentagon Proposes Big Cuts to US Navy Destroyer Construction, Retiring 13 Cruisers," *Defense News*, December 24, 2019.

[5] See, for example, Sam LaGrone, "CNO Gilday Calls for Budget Increase to Reach 355 Ship Fleet; New Battle Force

Navy's FY2021, Five-Year, and 30-Year Shipbuilding Plans

Treatment of Procurement Dates of CVN-81, 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. Consistent with congressional action on the Navy's FY2019 budget regarding the procurement of CVN-81, this CRS report treats CVN-81 as a ship that Congress procured (i.e., authorized and provided procurement funding for) in FY2019. Discussion in this CRS report of the Navy's FY2021 budget submission is adjusted to show CVN-81 as a ship that was procured 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, and the amphibious assault ship LHA-9 as a ship projected for procurement in FY2023. Consistent with congressional action on the Navy's FY2020 budget regarding the procurement of LPD-31 and LHA-9, this CRS report treats LPD-31 and LHA-9 as ships that Congress procured (i.e., authorized and provided procurement funding for) in FY2020. Discussion in this CRS report of the Navy's FY2021 budget submission is adjusted to show LPD-31 and LHA-9 as ships that were procured in FY2020.

For additional discussion regarding the treatment in this report of the procurement dates of CVN-81, LPD-31, and LHA-9, see **Appendix I**.

FY2021 Shipbuilding Request

The Navy states that its proposed FY2021 budget requests the procurement of eight new ships, but this figure includes LPD-31, an LPD-17 Flight II amphibious ship that Congress procured (i.e., authorized and appropriated procurement funding for) in FY2020 (see previous section.) Excluding this ship, the Navy's proposed FY2021 budget requests the procurement of seven new ships rather than eight, including

- one Columbia-class ballistic missile submarine (SSBN),
- one Virginia-class attack submarine (SSN),
- two DDG-51 destroyers,
- one FFG(X) frigate, and
- two TATS towing, salvage, and recue ships.

A figure of seven new ships is less than:

- the 11 ships that the Navy requested for FY2020 (a figure that excludes CVN-81, an aircraft carrier that Congress authorized in FY2019);
- the 13 ships that Congress procured in FY2020 (a figure that again excludes CVN-81, but includes the above-mentioned LPD-17 Flight II amphibious ship as well as an LHA amphibious assault ship that Congress also procured in FY2020);
- the 10 ships that the Navy projected under its FY2020 budget submission that it would request for FY2021; and

Count Won't Include Unmanned Ships," *USNI News*, January 14, 2020; Rich Abott, "CNO: Ship Count Will Not Include Unmanned; Bigger Topline Needed For Fleet Goal," *Defense Daily*, January 15, 2020; John M. Doyle, "CNO Wants Larger Slice of Defense Budget to Modernize, Meet China Threat," *Seapower*, January 15, 2020; Rich Abott, "CNO: Ship Count Will Not Include Unmanned; Bigger Topline Needed For Fleet Goal," *Defense Daily*, January 15, 2020.

- the average ship procurement rate that would be needed over the long run, given current ship service lives, to achieve and maintain a 355-ship fleet.

In dollar terms, the Navy is requesting a total of about $19.9 billion for its shipbuilding account for FY2021. This is about

- $3.9 billion (16.3 %) less than the Navy requested for the account for FY2020;
- $4.1 billion (17.0%) less than Congress provided for the account for FY2020; and
- $3.6 billion (15.3%) less than the $23.5 billion that the Navy projected under its FY2020 budget submission that it would request for the account for FY2021.

FY2021 Five-Year (FY2021-FY2025) Shipbuilding Plan

The Navy states that its FY2021 five-year (FY2021-FY2025) shipbuilding plan (**Table 2**) includes 44 new ships, but this figure includes the above-mentioned LPD-31 and LHA amphibious ships that Congress procured in FY2020. Excluding these two ships, the Navy's FY2021 five-year shipbuilding plan includes 42 new ships, which is

- 13 ships less than the 55 that were included in the FY2020 (FY2020-FY2024) five-year plan, and
- 12 ships less than the 54 that were projected for the period FY2021-FY2025 under the Navy's FY2020 30-year shipbuilding plan.

Table 2 also shows, for reference purposes, the ships funded for procurement in FY2020.

Table 2. FY2021 Five-Year (FY2021-FY2025) Shipbuilding Plan

FY2019 shown for reference

	FY20 (enacted)	FY21 (req.)	FY22	FY23	FY24	FY25	FY21-FY25 Total
Columbia (SSBN-826) class ballistic missile submarine							
Gerald R. Ford (CVN-78) class aircraft carrier	*[a]*	1			1		2
Virginia (SSN-774) class attack submarine	*2*	1	2	2	2	2	9
Arleigh Burke (DDG-51) class destroyer	*3*	2	2	1	2	1	8
FFG(X) frigate	*1*	1	1	2	2	3	9
LHA amphibious assault ship	*1 [b]*			[b]			
LPD-17 Fight II amphibious ship	*1 [b]*	[b]		1		1	2
Expeditionary Fast Transport (EPF) ship	*1*						
Submarine tender (AS[X])					1		1
John Lewis (TAO-205) class oiler	*2*			1	2	1	4
TATS towing, salvage, and rescue ship	*2*	2	1				3
TAGOS(X) ocean surveillance ship			1	1	1	1	4
TOTAL	***13***	**7**	**7**	**8**	**11**	**9**	**42**

Source: Table prepared by CRS based on FY2021 Navy budget submission, with adjustments as noted below

Notes: [a] The Navy's FY2021 budget submission presents the aircraft carrier CVN-81 as a ship that Congress procured in FY2020. Consistent with congressional action on the Navy's FY2019 budget regarding the procurement of CVN-81, this CRS report treats CVN-81 as a ship that Congress procured (i.e., authorized and provided procurement funding for) in FY2019. For additional discussion, see **Appendix I**. [b] The Navy's FY2021 budget submission presents LPD-31, an LPD-17 Flight II amphibious ship, as a ship requested for

procurement in FY2021, and the amphibious assault ship LHA-9 as a ship projected for procurement in FY2023. Consistent with congressional action on the Navy's FY2020 budget regarding the procurement of LPD-31 and LHA-9, this CRS report treats LPD-31 and LHA-9 as ships that Congress procured (i.e., authorized and provided procurement funding for) in FY2020. For additional discussion, see **Appendix I**.

The Navy has not yet submitted its FY2021 30-year (FY2021-FY2050) shipbuilding plan. As a placeholder pending the submission of that plan, **Table 3** shows the Navy's FY2020 30-year (FY2020-FY2049) 30-year shipbuilding plan. As shown in **Table 3**, the Navy's FY2020 30-year shipbuilding plan included 304 new ships, or an average of about 10 per year.

In devising a 30-year shipbuilding plan to move the Navy toward its ship force-structure goal, key assumptions and planning factors include but are not limited to ship construction times and service lives, estimated ship procurement costs, projected shipbuilding funding levels, and industrial-base considerations.

Table 3. FY2020 30-Year (FY2020-FY2049) Shipbuilding Plan

FY	CVNs	LSCs	SSCs	SSNs	LPSs	SSBNs	AWSs	CLFs	Supt	Total
20	1	3	1	3				2	2	**12**
21		2	2	2		1	1	1	1	**10**
22		2	2	2				1	2	**9**
23		3	2	2			1	2	3	**13**
24		3	2	2		1	1	1	1	**11**
25		3	2	2			1	1	2	**11**
26		2	2	2		1	1	1	2	**11**
27		3	2	2		1	2	1	1	**12**
28	1	2	2	2		1	1	1	1	**11**
29		3	2	2		1	1	1	1	**11**
30		2	1	2		1	1	1	2	**10**
31		3	2	2		1	2	1	2	**13**
32	1	2	2	2		1	1	1	2	**12**
33		3	2	2		1	1	1	2	**12**
34		2	2	2		1	2		2	**11**
35		3	2	2		1			1	**9**
36	1	2	2	2	1					**8**
37		3	2	2						**7**
38		2	2	2			1			**7**
39		3	2	2	1					**8**
40	1	2	2	2			1			**8**
41		3	2	2			1			**8**
42		2	2	2	1		1			**8**
43		3	2	2				1		**8**
44	1	2	2	2			1			**8**
45		3	2	2	1		2	2		**12**
46		2	2	2			1	2		**9**
47		3	2	2			1	2		**10**
48	1	2	2	2	1		2	2		**12**
49		3	2	2			1	2	3	**13**
Total	7	76	58	61	5	12	28	27	30	**304**

Source: U.S. Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, Table A2-1 on page 13.

Key: FY = Fiscal Year; **CVNs** = aircraft carriers; **LSCs** = surface combatants (i.e., cruisers and destroyers); **SSCs** = small surface combatants (i.e., Littoral Combat Ships [LCSs] and frigates [FFG(X)s]); **SSNs** = attack submarines; **LPSs** = large payload submarines; **SSBNs** = ballistic missile submarines; **AWSs** = amphibious warfare ships; **CLFs** = combat logistics force (i.e., resupply) ships; **Supt** = support ships.

Projected Force Levels Under FY2020 30-Year Shipbuilding Plan

The Navy has not yet submitted its FY2021 30-year (FY2021-FY2050) shipbuilding plan. As a placeholder pending the submission of that plan, **Table 4** shows the Navy's projection of ship force levels for FY2020-FY2049 that would result from implementing the FY2020 30-year (FY2020-FY2049) 30-year shipbuilding plan shown in **Table 3**.

Table 4. Projected Force Levels Resulting from FY2020 30-Year Shipbuilding Plan

	CVNs	LSCs	SSCs	SSNs	SSGN/LPSs	SSBNs	AWSs	CLFs	Supt	Total
355-ship goal	**12**	**104**	**52**	**66**	**0**	**12**	**38**	**32**	**39**	**355**
FY20	11	94	30	52	4	14	33	29	34	**301**
FY21	11	92	33	53	4	14	34	30	34	**305**
FY22	11	93	33	52	4	14	34	31	39	**311**
FY23	11	95	32	51	4	14	35	31	41	**314**
FY24	11	94	35	47	4	14	36	32	41	**314**
FY25	10	95	35	44	4	14	37	32	42	**313**
FY26	10	96	36	44	2	14	38	31	43	**314**
FY27	9	100	38	42	1	13	37	32	44	**316**
FY28	10	102	41	42		13	38	32	44	**322**
FY29	10	104	43	44		12	36	32	44	**325**
FY30	10	107	45	46		11	36	32	44	**331**
FY31	10	110	47	48		11	36	32	43	**337**
FY32	10	112	49	49		11	36	32	44	**343**
FY33	10	115	50	51		11	38	32	44	**351**
FY34	10	117	52	53		11	36	32	44	**355**
FY35	10	114	55	54		11	34	32	45	**355**
FY36	10	109	57	56		11	35	32	45	**355**
FY37	10	107	58	58		10	35	32	45	**355**
FY38	10	108	59	57		10	35	32	44	**355**
FY39	10	105	61	58		10	37	32	42	**355**
FY40	9	105	62	59		10	37	32	41	**355**
FY41	10	104	61	59		11	37	32	41	**355**
FY42	9	106	60	61		12	36	32	39	**355**
FY43	9	108	57	61	1	12	36	32	39	**355**
FY44	9	109	55	62	1	12	36	32	39	**355**
FY45	10	107	55	63	1	12	36	32	39	**355**
FY46	9	106	54	64	2	12	37	32	39	**355**
FY47	9	107	54	65	2	12	35	32	39	**355**
FY48	9	109	51	66	2	12	35	32	39	**355**
FY49	10	108	50	67	3	12	35	31	39	**355**

Source: U.S. Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, Table A2-4 on page 13.

Note: Figures for support ships include five JHSVs transferred from the Army to the Navy and operated by the Navy primarily for the performance of Army missions.
Key: FY = Fiscal Year; **CVNs** = aircraft carriers; **LSCs** = surface combatants (i.e., cruisers and destroyers); **SSCs** = small surface combatants (i.e., frigates, Littoral Combat Ships [LCSs], and mine warfare ships); **SSNs** = attack submarines; **SSGNs/LPSs** = cruise missile submarines/large payload submarines; **SSBNs** = ballistic missile submarines; **AWSs** = amphibious warfare ships; **CLFs** = combat logistics force (i.e., resupply) ships; **Supt** = support ships.

New FSA Will Replace 355-Ship Goal and Could Alter Distribution of Shipbuilding Work

New FSA Is Called an Integrated FSA (INFSA)

A new FSA—referred to as 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.[6] 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 previous FSAs. DON officials state that the INFSA will take into account the Trump Administration's December 2017 National Security Strategy document and its January 2018 National Defense Strategy document, both of which put an emphasis on renewed great power competition with China and Russia,[7] as well as updated information on Chinese and Russian naval and other military capabilities and recent developments in new technologies, including those related to unmanned vehicles (UVs).[8]

INFSA to Be Released Sometime During Spring of 2020

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 budget submission.[9] A December 6, 2019, memorandum from

[6] 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.)

[7] 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.

[8] 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.

[9] 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

Acting Secretary of the Navy Thomas Modly stated that he expected the final INFSA to be published no later than January 15, 2020.[10] A January 23, 2020, press report quoted Modly as saying that the January 15 date was an internal Navy deadline, and that the Navy expects that the INFSA will be released to outside audiences sometime during the spring of 2020,[11] which would be well after the submission of the Navy's proposed FY2021 budget on February 10, 2020, and perhaps after the defense committees have completed most or all of their FY2021 budget-review hearings moved into markup on the FY2021 National Defense Authorization Act.

In his December 6, 2019, memorandum, Acting Secretary Modly stated that "my staff and I will become involved" in the INFSA, and that one of his five immediate objectives as acting secretary is to "establish an Integrated Plan to achieve a [fleet of] 355 (or more) ships, Unmanned Underwater Vehicles (UUVs), and Unmanned Surface Vehicles (USVs) for greater global naval power, within 10 years."

New INFSA Could Call for a Navy of About 390 Manned Ships

Statements from Navy officials in the early months of 2020 suggest 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. Navy officials have provided few additional details about the composition of this 390/435-ship force-level goal.[12] Navy officials have stated that the INFSA is being closely reviewed by the Secretary of Defense Mark Esper; it is possible that this review could lead to a change in the figures of 390 manned ships and 45 unmanned or optionally manned ships.[13]

INFSA Could Result in Once-in-a-Generation Change in Fleet Architecture and Distribution of Shipbuilding Work

Statements from DON officials suggest 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 and used to perform various missions. As detailed in the following sections of this report, 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

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Emerging Warfare Concepts," *USNI News*, October 23, 2019.

[10] 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.

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

[12] 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.

[13] See, for example, Paul McLeary, "Esper To Navy: Rethink Your Shipbuilding Plan," *Breaking Defense*, February 25, 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.

the distribution of Navy shipbuilding work among the nation's shipyards. A February 3, 2020, press report, for example, stated

> The Navy's plans to get to 355 manned ships by 2030 will rely on new classes of ships that don't exist yet—including new kinds of amphibious and supply ships as well as "lightly manned" ships—the acting Navy secretary told USNI News.
>
> The Force Structure Assessment that will lay out the Navy's path to this larger fleet, which leadership has described as "355-plus, plus unmanned," has been delayed and won't come out until after the Fiscal Year 2021 budget request is released next week. FY 2021 will put the Navy on a path to crest over 300 ships, Acting Secretary of the Navy Thomas Modly told USNI News in a phone interview, but the real growth will come in the FY 2022 request.
>
> Still, Modly previewed what the FSA might hold.
>
> "We haven't done a really comprehensive force structure assessment in a couple of years; 2016 was the last one. So we started on a new path for that last fall, and what we're finding in that force structure assessment is that the number of ships we need are going to be more than 355. And when you add in some of the unmanned vessels and things like that that we're going through experimental phases on, it's probably going to be significantly more than [355]," he said.
>
> "There are certain ship classes that don't even exist right now that we're looking at that will be added into that mix, but the broad message is, it's going to be a bigger fleet, it's going to be a more distributed fleet, it's going to be a more agile fleet. And we need to figure out what that path is and also understand our topline limitations, because no one wants a 355-plus fleet that's hollow, that we can't maintain. So we're looking at balancing all those things."
>
> Asked what new ship classes the service is considering, Modly mentioned new amphibious ships, as well as new kinds of supply ships and "lightly manned" ships that are "more like missile magazines that would accompany surface action groups."
>
> Talk of a new class of amphibious warships began last summer, when Commandant of the Marine Corps Gen. David Berger called for alternative kinds of amphibious lift for Marines in his Commandant's Planning Guidance. Since that time, Marine Corps and Navy officials at various conferences have suggested that the services are narrowing in on the Offshore Support Vessel [OSV] as a model for what they want. Having several OSVs instead of one dock landing ship (LSD), for example, might be able to carry the same number of Marines but distribute them across the littorals instead of concentrating them on one hull—which defensively makes them harder to target and offensively allows them to be more agile under the Distributed Maritime Operations and Expeditionary Advance Base Operations concepts.
>
> On the other hand, public talk of a "lightly manned" ship type is new. The Navy had previously envisioned its Large Unmanned Surface Vehicle [LUSV] to serve as a magazine ship for manned combatants, but Congress used its annual defense bill to block the Navy from building an unmanned ship with vertical launch tubes. Making these ships "lightly manned" could keep the magazine ship concept alive while alleviating congressional concerns, and could create the added benefit of allowing the small crews to use their hulls to train with other nations' navies during peacetime….
>
> Modly, when asked why the Navy was betting so much of its ability to get to 355 ships by the end of the decade on quickly acquiring brand new ship classes that haven't gone through the Navy and industry design and construction process yet, said, "I think 'quickly' is going to have to define everything we do, because the world is changing pretty quickly and we're going to have to react more quickly."

> "You look at the frigate [FFG(X)] program: we think, because of the way we've approached that program, we've probably taken three years off the product development lifecycle for that. So we have to start doing the same type of thing: looking at proven hulls, things that can be adaptable for different areas. I understand the Hill's concerns about unmanned, and we get that. … We have to convince them with data: we have to wargame this, we have to iterate it over and over again."
>
> The acting secretary added that President Donald Trump ran in 2016 on a larger fleet, and Congress passed the 355 figure into law in 2017. Though the Navy only has assumptions from wargames and simulations today regarding these new classes of ships, he said the service needed to settle on a "north star" and begin the research and development and construction to get hulls in the water, and then it could refine its vision as needed once fleet leaders understand how the new and old ships work together to bring naval power to a distributed fight.…
>
> Modly said the FY 2021 budget—expected to be released next week—will allow the Navy to grow some, ahead of what he expects will be a much stronger 2022 budget.
>
> "I think what you'll see is mostly an emphasis on readiness—we don't want to have a hollow force, and so we had to make some trades in the end game, but we're still on a path to grow the Navy," he said.
>
> "This year, this budget will keep us on a path to grow to over 300, but the ultimate goal was to grow to an even bigger fleet than that," and the Navy is already looking at its 2022 planning and eyeing multiple paths to grow faster.[14]

The following sections provide details on how the Navy's new fleet architecture could alter the mix of ships within various parts of the Navy.

Potential New Surface Combatant Force Architecture

Statements from Navy officials suggest that the new FSA 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). In presenting its proposed FY2020 and FY20201 budgets, the Navy has highlighted its plans for developing and procuring USVs in coming years.

Figure 1 provides, for the surface combatant portion of the Navy,[15] 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).

[14] Megan Eckstein, "SECNAV Modly: Path to 355 Ships Will Rely on New Classes of Warships," *USNI News*, February 3, 2020. See also Rich Abott, "Modly Explains Why 355 Ship FSA In A Decade, Presenting To Esper In Days," *Defense Daily*, January 29, 2020; Rich Abott, "Modly: Future Navy Focusing On Next 10 Years," *Defense Daily*, January 24, 2020.

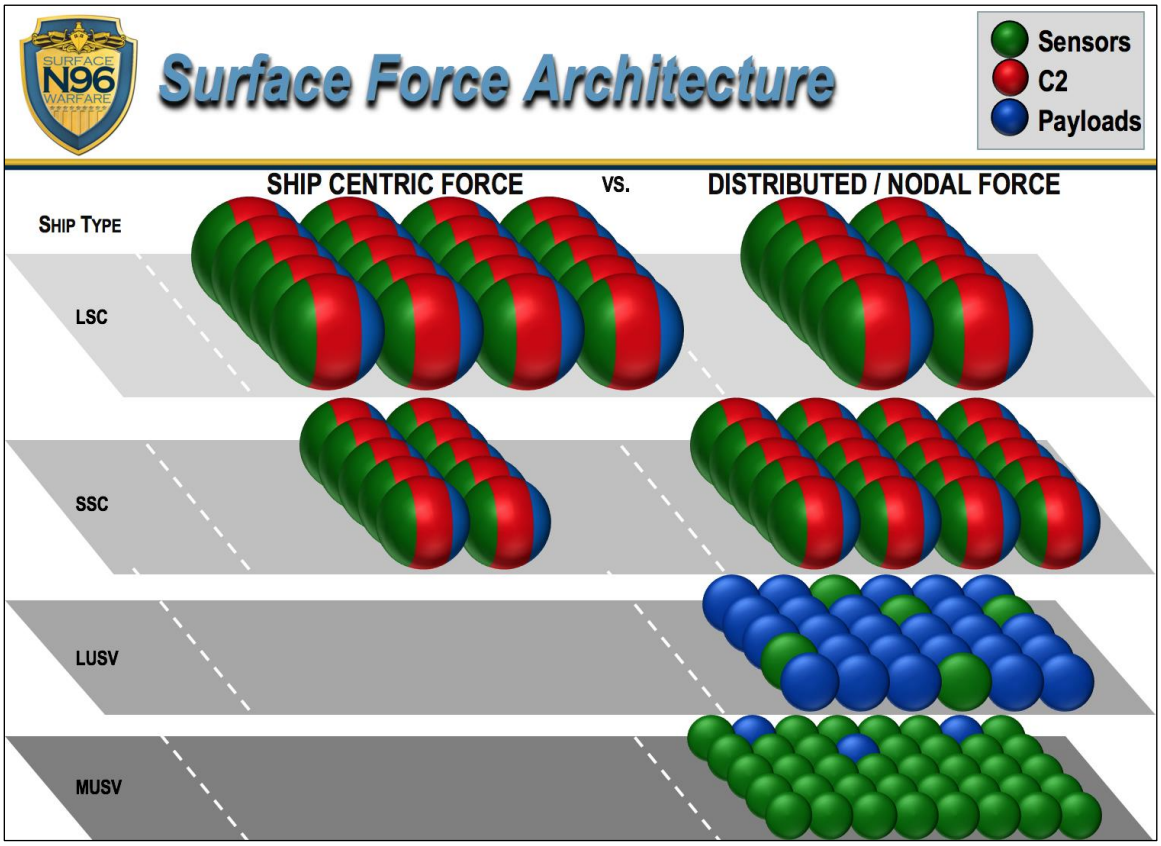
[15] Other major parts of the Navy include submarines, aircraft carriers, amphibious ships, logistics (resupply) ships, and support ships.

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.

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 Littoral Combat Ship). 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).

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."[16]

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.[17]

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.[18]

Potential New Amphibious Ship Architecture

Statements from the Commandant of the Marine Corps suggest strongly that the new FSA 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 shown in **Table 1** is intended to meet a requirement for having enough amphibious lift to lift the assault echelons of two Marine

[16] David B. Larter, "US Navy Moves Toward Unleashing Killer Robot Ships on the World's Oceans," *Defense News*, January 15, 2019.

[17] 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.

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

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.[19]

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). The *Commandant's Planning Guidance*, which effectively announces a once-in-a-generation change in Marine Corps thinking on this and other issues relating to the Marine Corps, states in part (emphasis as in the original):

> Our Nation's ability to project power and influence beyond its shores is increasingly challenged by long-range precision fires; expanding air, surface, and subsurface threats; and the continued degradation of our amphibious and auxiliary ship readiness. The ability to project and maneuver from strategic distances will likely be detected and contested from the point of embarkation during a major contingency. Our naval expeditionary forces must possess a variety of deployment options, including L-class [amphibious ships] and E-class [expeditionary ships] ships, but also increasingly look to other available options such as unmanned platforms, stern landing vessels, other ocean-going connectors, and smaller more lethal and more risk-worthy platforms. **We must continue to seek the affordable and plentiful at the expense of the exquisite and few when conceiving of the future amphibious portion of the fleet.**
>
> We must also explore new options, such as inter-theater connectors and commercially available ships and craft that are smaller and less expensive, thereby increasing the affordability and allowing acquisition at a greater quantity. We recognize that we must distribute our forces ashore given the growth of adversary precision strike capabilities, so it would be illogical to continue to concentrate our forces on a few large ships. The adversary will quickly recognize that striking while concentrated (aboard ship) is the preferred option. We need to change this calculus with a new fleet design of smaller, more lethal, and more risk-worthy platforms. We must be fully integrated with the Navy to develop a vision and a new fleet architecture that can be successful against our peer adversaries while also maintaining affordability. To achieve this difficult task, the Navy and Marine Corps must ensure larger surface combatants possess mission agility across sea control, littoral, and amphibious operations, while we concurrently expand the quantity of more specialized manned and unmanned platforms….
>
> **We will no longer use a "2.0 MEB requirement" as the foundation for our arguments regarding amphibious ship building, to determine the requisite capacity of vehicles or other capabilities, or as pertains to the Maritime Prepositioning Force. We will no longer reference the 38-ship requirement memo from 2009, or the 2016 Force Structure Assessment, as the basis for our arguments and force structure justifications.** The ongoing 2019 Force Structure Assessment will inform the amphibious requirements based upon this guidance. The global options for amphibs [types of

[19] 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.

amphibious ships] include many more options than simply LHAs, LPDs, and LSDs. I will work closely with the Secretary of the Navy and Chief of Naval Operations (CNO) to ensure there are adequate numbers of the right types of ships, with the right capabilities, to meet national requirements.

I do not believe joint forcible entry operations (JFEO) are irrelevant or an operational anachronism; however, we must acknowledge that different approaches are required given the proliferation of anti-access/area denial (A2AD) threat capabilities in mutually contested spaces. Visions of a massed naval armada nine nautical miles off-shore in the South China Sea preparing to launch the landing force in swarms of ACVs [amphibious combat vehicles], LCUs [utility landing craft], and LCACs [air-cushioned landing craft]are impractical and unreasonable. We must accept the realities created by the proliferation of precision long-range fires, mines, and other smart-weapons, and seek innovative ways to overcome those threat capabilities. I encourage experimentation with lethal long-range unmanned systems capable of traveling 200 nautical miles, penetrating into the adversary enemy threat ring, and crossing the shoreline—causing the adversary to allocate resources to eliminate the threat, create dilemmas, and further create opportunities for fleet maneuver. We cannot wait to identify solutions to our mine countermeasure needs, and must make this a priority for our future force development efforts….

Over the coming months, we will release a new concept in support of the Navy's Distributed Maritime Operations (DMO) Concept and the NDS called – Stand-in Forces. The Stand-in Forces concept is designed to restore the strategic initiative to naval forces and empower our allies and partners to successfully confront regional hegemons that infringe on their territorial boundaries and interests. **Stand-in Forces are designed to generate technically disruptive, tactical stand-in engagements that confront aggressor naval forces with an array of low signature, affordable, and risk-worthy platforms and payloads.** Stand-in forces take advantage of the relative strength of the contemporary defense and rapidly-emerging new technologies to create an integrated maritime defense that is optimized to operate in close and confined seas in defiance of adversary long-range precision "stand-off capabilities."

Creating new capabilities that intentionally initiate stand-in engagements is a disruptive "button hook" in force development that runs counter to the action that our adversaries anticipate. Rather than heavily investing in expensive and exquisite capabilities that regional aggressors have optimized their forces to target, naval forces will persist forward with many smaller, low signature, affordable platforms that can economically host a dense array of lethal and nonlethal payloads.

By exploiting the technical revolution in autonomy, advanced manufacturing, and artificial intelligence, the naval forces can create many new risk-worthy unmanned and minimally-manned platforms that can be employed in stand-in engagements to create tactical dilemmas that adversaries will confront when attacking our allies and forces forward.[20]

[20] U.S. Marine Corps, *Commandant's Planning Guidance, 38th Commandant of the Marine Corps*, undated, released July 2019, pp. 4-5, 10. 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 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

A February 20, 2020, press report about a potential new type of stern-landing amphibious ship states:

> The Navy's research and development portfolio will devote $30 million to a "next-generation medium amphibious ship design" that will likely be based on an Australian designer's stern landing vessel….
>
> The Navy and Marines announced in the Fiscal Year 2021 budget request that they will seek a medium amphibious ship that can support the kind of dispersed, agile, constantly relocating force described in the Littoral Operations in Contested Environment (LOCE) and Expeditionary Advanced Base Operations (EABO) concepts the Marine Corps has written, as well as the overarching Distributed Maritime Operations (DMO) from the Navy. According to a budget overview document, "a next-generation medium amphibious ship will be a stern landing vessel to support amphibious ship-to-shore operations."
>
> "FY 2021 funds support concept evaluation/design, industry studies and exploration for a medium-lift intra-theater amphibious support vessel. Efforts include requirements development, systems engineering, naval architecture and marine engineering, and operations research analysis," reads a justification book that accompanies the budget request.
>
> The Navy and Marines had previously cited the Offshore Support Vessel as a possible inspiration for their new design….
>
> However, since that time, Marine Corps planners took another look at the features they'd need on this medium amphibious ship, rather than limiting their talks to existing ship designs, USNI News understands. Those talks led to a realization that they not only wanted a ship that could move Marines around with some range, but they also wanted the ship to be able to beach itself like a landing craft does, to help offload gear and vehicles as needed. These talks led to a new focus on the stern landing vessel designed by Australian company Sea Transport, which could serve as the new inspiration for the medium amphibious vehicle as requirements development and EABO wargaming and simulations take place….

The Navy and Marines are not committed yet to this design or to Sea Transport, but USNI News understands that something like a SLV would combine a surface ship's ability to have great enough endurance and range to be operationally useful to commanders and a landing craft's ability to beach itself to offload larger equipment.[21]

Potential New Aircraft Carrier/Naval Aviation Force Architecture

Statements from Navy officials suggest that the Navy is 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.

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.

[21] Megan Eckstein, "Navy Researching New Class of Medium Amphibious Ship, New Logistics Ships," *USNI News*, February 20, 2020. See also Rich Abott, "FY 2021 Request Starts Work on Future Amphibs and Logistics Ships," *Defense Daily*, February 20, 2020; David Axe, "This Weird Little Ship Could Be the Future of Amphibious Warfare," *National Interest*, February 24, 2020.

One option for a smaller carrier is the so-called Lighting Carrier, a term referring to an LHA-type amphibious assault ship equipped with an air wing consisting largely of F-35B Joint Strike Fighters (JSFs). (The alternate name for the F-35 is the Lighting 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 experimented with the Lightning Carrier concept.[22]

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.

A February 15, 2019, press report stated the following:

> Under Secretary of the Navy Thomas Modly said now that the Navy found a way to build two new Gerald R. Ford-class aircraft carriers [CVN-80 and CVN-81] while saving money it is starting to look at future carrier procurement, which might be very different.…
>
> Modly said Secretary of the Navy Richard Spencer sees $13 billion carriers as not sustainable going forward and the service will be looking at ways to further reduce costs or keep the carrier capabilities more affordable in future ship procurements.
>
> "There was general conclusion that those two for sure would be built" and once that was determined "that was going to happen," Modly said during the AFCEA [Armed Forces Communications and Electronics Association] West 2019 conference here [in San Diego].…
>
> After the CVN-80 and -81 [procurement] decision was made, "I think a lot of derivative decisions still need to be made. So the secretary [Spencer] would like to take a look at 'O.K. now that we made that decision, and that second one that comes will be in quite a few years from now, we need to start thinking now about what's the next one look like.'"
>
> Modly told reporters they are asking questions like "Is it going to be advanced as this one? Or is it going to be smaller or are we going to buy two smaller ones or maybe shift air power to other forms of delivery. And we don't know the answers of that but we're looking at this."[23]

An October 24, 2019, press report stated

> The secretary of the U.S. Navy said the sea service is looking ahead to determine what the follow-on aircraft carrier design will look like, even as work continues to get the new USS Gerald R. Ford [CVN-78] out to regular operations at sea.
>
> "With the [recent] two-carrier [CVN-80 and CVN-81] buy, what will the next carrier look like? We're having discussions on that as we speak, and we will see what happens," Navy Secretary Richard V. Spencer said, speaking Oct. 23 at the Brookings Institution, a Washington think tank. "I think we actually whiteboard this thing. What will it look like in 10 to 15 years? Is it a floating platform for electrically charged unmanned aircraft? I don't know."
>
> Spencer said the Navy is looking at the "lightning carrier" concept, deploying 20 F-35B Lightning II strike fighters on an amphibious assault ship. Recently the USS America operated in the eastern Pacific Ocean with 13 F-35Bs of Marine Fighter Attack Squadron

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

[23] Rich Abott, "Navy Starts Looking At Carriers After CVN-81," *Defense Daily*, February 15, 2019.

> (VMFA) 122, the Corps' most recently equipped F-35B squadron. Earlier this year, USS Wasp operated for a short period with 10 F-35Bs of VMFA-121 on board.
>
> "My cost performance there is tremendous," Spencer said. "Does it have the same punch? No, it doesn't. But it has a very interesting sting to it."
>
> Such lightning carriers would lack airborne early warning aircraft unless the Navy developed a capability for these smaller decks. The sea service is developing an aerial refueling tanker capability to be installed in the MV-22 Osprey tilt-rotor aircraft to refuel the F-35Bs.
>
> During the opening phase of Operation Iraqi Freedom in 2003, the amphibious assault ship USS Bataan operated as a "Harrier carrier," equipped with two full squadrons of AV-8B Harrier II attack aircraft, which the F-35B is replacing, rather than the usual six aircraft.
>
> The concept might get a serious workout in a couple of years.
>
> "In 2021, you will see a Marine Corps F-35B squadron on the Queen Elizabeth, which we are very excited about," Spencer said, speaking of the plan to operate a Marine Corps F-35B squadron alongside a British F-35B squadron on the new Royal Navy aircraft carrier.[24]

An October 30, 2019, press report about remarks made by Secretary Spencer at a media roundtable event held that day at the Heritage Foundation stated that

> The secretary embraced [Marine Corps Commandant General David] Berger's proposal to use large-deck amphibious ships loaded with F-35B "Lightning II" strike fighters. He said: "Does it have the same strike capability as a carrier? No, it doesn't. But if part of the mission of the carrier is presence and forward deployability … lightning carriers [are] a great option to augment what the requirement might be."[25]

A December 5, 2019, press report states

> The Navy is unclear how it will proceed with its next generation of aviation combatants following the introduction of the F-35C Lighting II Joint Strike Fighter into the carrier air wing, Chief of Naval Operations Adm. Mike Gilday said on Thursday [December 5]….
>
> Gilday indicated the Navy is still working on the question of what the next [aviation] combatant after F-35 will be, or even if it will be launched from an aircraft carrier.
>
> "I do think we need an aviation combatant, but what the aviation combatant of the future looks like? I don't know yet. I think there's going to be a requirement to continue to deliver a seaborne launched vehicle through the air that'll deliver an effect downrange," Gilday said at U.S. Naval Institute's Defense Forum Washington conference.
>
> "I do think that that will likely be a mix of manned and unmanned. The platform which they launch from? I'm not sure what that's going to look like."[26]

A January 29, 2020, press report stated

> The Navy could start lobbying Congress to rethink a law requiring it to have 12 massive aircraft carriers in its arsenal, the service's acting secretary said.

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[24] Richard R. Burges, "Secretary: Navy Discussing Next-Gen Carrier Concepts, Including 'Lightning Carrier,'" *Seapower*, October 24, 2019. See also Wesley Morgan, "Navy Secretary Accuses Congressional Critics of 'Disinformation' on Ford Carrier," *Politico Pro*, October 23, 2019.

[25] Otto Kreisher, "Spencer Lauds Tight Integration of Navy, Marine Forces in 'Great Power Competition,'" *Seapower*, October 27, 2019. Ellipsis as in original.

[26] Sam LaGrone, "Navy Still Mulling Post-F-35C Aviation Combatant; Could be Mix of Manned, Unmanned Aircraft," *USNI News*, December 5, 2019.

> Acting Navy Secretary Thomas Modly said Wednesday that "everything is on the table" when it comes to the next force structure assessment, which will lay out a plan for the types and numbers of vessels the service needs….
>
> "I think that number is going to be less [than 12 carriers]," he said Wednesday [January 29] at an event on the Navy's future surface force. The event was hosted by the Center for Strategic and Budgetary Assessments in Washington, D.C.
>
> Modly pointed to the high $13 billion price tag on each of the Ford-class carriers. He also said top Navy and Marine Corps leaders are looking closely at what kinds of ships they need for more distributed operations -- more platforms across a bigger area -- as they face new threats from capable militaries, such as China, Russia and Iran.
>
> "The big question, I think at the top of the list, is the carrier," he said of the future fleet. "What's the future carrier going to look like and what's the future carrier mix going to look like? These are really, really expensive assets."…
>
> Modly declined to say whether there are new plans to cut any carriers in 2021 since the president's budget isn't finalized. As the Navy looks at how it'll fight in the years to come, though, Modly said carriers would be considered attractive targets.
>
> "Of course, we're developing all kinds of things to make it less vulnerable, but it's still a big target," he said. "And it doesn't give you that distribution that I think we want."
>
> Modly said the conversation about possibly shedding aircraft carriers is one that must continue. But it can't be had only inside the Pentagon, he added.
>
> "This is a national discussion," Modly said. "I think as many people that get involved in this, the better. Congress obviously has interests; our shipbuilding industry does as well. We all do. We want to have a strong shipbuilding industry; we want to be able to continue to produce those carriers -- they're important.
>
> "But we have to think about what the future is," he added.[27]

A March 5, 2020, press report states:

> The Navy is launching a deep dive into the future of its aircraft carrier fleet, Breaking Defense has learned, even as the Secretary of Defense, dissatisfied with current Navy plans, conducts his own assessment. The two studies clearly show the deepening concern over how China's growing might and the Pentagon's eroding budgets could affect the iconic, expensive supercarriers.
>
> The Future Carrier 2030 Task Force, which the service plans to announce next week, will take six months to study how carriers stack up against new generations of stealthy submarines and long-range precision weapons being fielded by China and Russia. It comes at a fraught moment time for the fleet, as Defense Secretary Mark Esper has taken personal ownership over the service's force planning while publicly lambasting the Navy's deployment model as broken.
>
> Two sources familiar with the planning said the effort is focused on threats in 2030 and beyond—which, given the years it takes to design, develop, and build new classes of ships, could affect budget decisions in the fairly near future. The study could have major implications on how the Navy designs and builds carriers, the sources agreed.

[27] Gina Hawkins, "Acting SecNav Hints at Fewer Aircraft Carriers in Next Ship-Count Plan," *Military.com*, January 29, 2020. See also 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.

> The study will also have to account for knock-on effects on the work shipbuilders would get in the future, which is always a politically-charged issue. For decades, Newport News in Virginia—now owned by Huntington Ingalls Industries—has been the only shipyard in the world capable of constructing a nuclear-powered supercarrier. The yard is currently under contract for the four new Ford-class carriers, worth tens of billions of dollars, which are slated to enter the fleet in the coming decade.
>
> The Future Carrier 2030 Task Force is being put together by Acting Navy Secretary Thomas Modly, who expects a report back in about 180 days.
>
> Modly's task force study, however, will run in parallel with work already being done on the Navy's future force structure by Deputy Defense Secretary David Norquist. Sec. Esper recently ordered his deputy to review both the Navy's 30 year shipbuilding plan and its highly-anticipated modernization plan after Esper was unsatisfied with the plans the Navy offered him. The secretary said last week in a letter to the chairman of the House Armed Services Committee he expects the relook to wrap up by summer.
>
> These two parallel—and to some extent competing—studies make Modly's timeline tricky. His task force won't wrap up until after the Pentagon's reviews are done, and Modly will likely have left the secretary's chair. The White House nominated Amb. Kenneth Braithwaite to be Navy Secretary last week, but it's unclear when his confirmation hearing will be held.
>
> Modly hinted at his study this morning during testimony before the Senate Armed Services Committee. "We have a duty to look at what will come after the Ford," he said, adding that the Navy has "some breathing room" before having to decide what comes after that last Ford is built in 2032.
>
> Modly's testimony, taken with similar recent comments about capping the Ford carriers at four before moving in a new direction, could signal a major shift in the Navy's thinking. "I don't know if we're going to buy any more of that type," Modly said in an interview published on March 4. "We're certainly thinking about possible other classes. What are we going to learn on these four that's going to inform what we do next?"
>
> Back in January, he voiced similar concerns with the size and design of the current carrier fleet at a Center for Strategic and Budgetary Assessments event. "The big question, I think at the top of the list, is the carrier and what's the future going to look like…I think we agree with a lot of conclusions that [carriers are] more vulnerable."[28]

A March 12, 2020, press report stated:

> Acting Secretary of the Navy Thomas Modly this week kicked off a Future Carrier 2030 Task Force effort to look at the future of aircraft carriers and carrier-based aviation. Modly acknowledged the next day, while talking to three reporters in his office, that changing how to think about the Navy's largest platform has proven difficult in the past.
>
> "I think I sort of want them to look at this from a clean-sheet perspective. Now, granted, doing that in a program like this is difficult to do because there are certain industrial capabilities that we have to keep in mind in order to do that. But I want them to think about, A—particularly these new Ford-class carriers that have a lot more capability than the Nimitz-class carriers do, significantly more power generation, the ability to launch all different kinds of aircraft more quickly, to include unmanned—how are we thinking about that and how we might deploy it in 20, 25, 30 years in terms of what would be on that ship? What would that mix look like? What would that carrier air wing look like on that?" Modly said in his office.

[28] Paul McLeary, "Beyond The Ford: Navy Studies Next-Gen Carriers EXCLUSIVE," Breaking Defense, March 5, 2020.

"But then looking beyond that, okay, do we continue to build those, or do we build something different? Do we look at maybe building something smaller? Maybe something conventionally powered? I don't know the answer to that. These studies have been done before, so we're going to dust off a lot of those again, look at the threat environment, and say, okay, this is maybe the right direction for us to go."

But he said the context of today's look—the Navy is trying to free up funds to grow in size, not looking for cuts to shrink—could potentially change the calculus. This carrier task force is taking place alongside an Office of the Secretary of Defense study of the Navy's Integrated Naval Force Structure Assessment, which was meant to be a wholesale look at the future fleet, to include ship classes that don't exist today and unmanned systems that are still in the development phase.

Cutting the aircraft carrier program – or drastically changing the face of it, for example, by choosing to pursue a conventionally powered carrier – puts at risk 57,000 jobs across 46 states, Modly said. But, the nuclear-powered carrier and submarine programs share many of the same suppliers, and it could be possible that if the carrier task force and the INFSA review worked in tandem, they could find an avenue that would allow for a different kind of aircraft carrier without wrecking the industrial base.

"Ultimately, we have to consider [the industrial base] when we look at everything. … We have to give industry enough time to be able to adjust," Modly said.

"And we are going to continue to be building nuclear-powered submarines going forward, so the Columbia class, the Virginia class, whatever comes after the Virginia class. So we're going to have to sustain that capability to do nuclear-powered ships. The question is, do we continue to do that on carriers, or is there some other alternative that makes more sense for us? I don't know the answer to that, and that's what we're asking the group to look at."…

"Nuclear-powered carriers give us tremendous advantages because of their ability to both generate power, but their ability to move at certain speeds that conventional can't, and they can be out for longer periods of time without having to be refueled, et cetera, all those advantages. And those are big advantages and those should be considered," the acting secretary said.

"But then there are some other potential disadvantages to that as well, one being cost, the other one being size, and your ability to hide something that big is difficult, too."

Ultimately, Modly acknowledged the need to take industrial base considerations seriously but also foot-stomped the need to seriously consider choosing a different future for the carrier force.

"We're looking at how we can grow this Navy, how we can support Distributed Maritime Operations in the future scenario, in a threat-based scenario where we're going to be dealing with a very unpredictable set of circumstances in the future. And so what platforms give us the best ability to respond to that? So you got the whole Pacific Ocean, Indo-Pacific theater set of challenges. You've got the whole Atlantic set of challenges. And now you've got Arctic challenges. You've got challenges in South America, in Africa. These are all maritime challenges in all these different parts of the world. I don't think we're going to retreat as a naval power, so how do we effectively build a force that can address all those things?" he said.

"So I know that there are a lot of people that – I don't think people necessarily support the carriers purely for the economic and parochial reasons. I think there are people who believe in them because that's the way the Navy has operated for the past 50 or 60 years. And that's fine. But we have to think differently about the future, I think. So we need to think about what types of ships we might need in the future. And the carrier will likely be part of that, for the next 50 years for sure, but we need to start thinking beyond that as well."

Modly's Future Carrier 2030 Task Force will run for the next six months, until about September.

In the meantime, Defense Secretary Mark Esper's review of the Integrated Naval Force Structure Assessment will run through about July.[29]

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."[30]

Potential New Undersea Force Architecture

The new FSA might also change the Navy's undersea force to a more distributed architecture that includes, in addition to attack submarines (SSNs) and bottom-based sensors, a new element of extra-large unmanned underwater vehicles (XLUUVs), which might be thought of as unmanned submarines. In presenting its proposed FY2020 budget, the Navy highlighted its plans for developing and procuring UUVs in coming years.[31]

Rationale for a More Distributed Fleet Architecture

Some observers have long urged the Navy to shift to a more distributed fleet architecture, on the grounds that the Navy's current architecture—which concentrates much of the fleet's capability into a relatively limited number of individually larger and more expensive surface ships—is increasingly vulnerable to attack by the improving maritime anti-access/area-denial (A2/AD) capabilities (particularly anti-ship missiles and their supporting detection and targeting systems) of potential adversaries, particularly China.[32] Shifting to a more distributed architecture, these observers have argued, would

- complicate an adversary's targeting challenge by presenting the adversary with a larger number of Navy units to detect, identify, and track;
- reduce the loss in aggregate Navy capability that would result from the destruction of an individual Navy platform;
- give U.S. leaders the option of deploying USVs and UUVs in wartime to sea locations that would be tactically advantageous but too risky for manned ships; and

[29] Megan Eckstein, "Modly: Parallel Fleet Studies Could Reshape Future of Aircraft Carriers," *USNI News*, March 12, 2020. See also David Axe, "What Comes After the Nuclear-Powered Aircraft Carrier?" *National Interest*, March 7, 2020.

[30] 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.

[31] For further discussion, see CRS Report R45757, *Navy Large Unmanned Surface and Undersea Vehicles: Background and Issues for Congress*, by Ronald O'Rourke.

[32] For more on China's maritime A2/AD capabilities, see CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke.

- increase the modularity and reconfigurability of the fleet for adapting to changing mission needs.[33]

For a number of years, DON leaders acknowledged the views of those observers but continued to support the current fleet architecture. More recently, however, DON leaders appear to have shifted their thinking toward support for moving the fleet to a more distributed architecture. DON leaders appear to have shifted their thinking in favor of a more distributed architecture because they now appear to believe that such an architecture will be

- **operationally necessary**, as the observers have long argued, to respond effectively to the improving maritime A2/AD capabilities of other countries, particularly China;[34]
- **technically feasible** as a result of advances in technologies for UVs and for networking widely distributed maritime forces that include significant numbers of UVs; and
- **affordable**—no more expensive, and possibly less expensive, than the current architecture, so as to fit within future Navy budgets that Navy officials expect to be flat or declining in real (i.e., inflation-adjusted) terms compared to the Navy's current budget.

The more distributed architecture that Navy leaders now appear to support may differ in its details from distributed architectures that the observers have been advocating, but the general idea of shifting to a more distributed architecture, and of using large UVs as a principal means of achieving that, appears to be similar. The Department of Defense (DOD) states that

> The FY 2020 budget request diversifies and expands sea power strike capacity through procurement of offensively armed Unmanned Surface Vessels (USVs). The USV investment, paired with increased investment in long-range maritime munitions, represents a paradigm shift towards a more balanced, distributed, lethal, survivable, and cost-imposing naval force that will better exploit adversary weaknesses and project power into contested environments.[35]

Distributed Maritime Operations (DMO)

Shifting to a more distributed force architecture, Navy officials have suggested, could be appropriate for implementing the Navy's new overarching operational concept, called Distributed Maritime Operations (DMO). The Navy's FY2020 30-year shipbuilding plan mentions DMO,[36] and a December 2018 document from the Chief of Naval Operations states that the Navy will "Continue to mature the Distributed Maritime Operations (DMO) concept and key supporting concepts" and "Design and implement a comprehensive operational architecture to support DMO."[37] While Navy officials have provided few details in public about DMO, then-Chief of Naval Operations Admiral John Richardson, in explaining DMO, stated in December 2018 that

[33] See, for example, Arthur H. Barber, "Redesign the Fleet," *U.S. Naval Institute Proceedings*, January 2019.

[34] See, for example, David B. Larter, "With China Gunning for Aircraft Carriers, US Navy Says It Must Change How It Fights," *Defense News*, December 6, 2019.

[35] Department of Defense, Office of the Undersecretary of Defense (Comptroller)/Chief Financial Officer, *Defense Budget Overview, United States Department of Defense, Fiscal Year 2020 Budget Request*, March 2019, pp. 4-5 to 4-6.

[36] U.S. Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, March 2019, pp. 3, 4, 7, 8, 15, 17, 24.

[37] U.S. Navy, Chief of Naval Operations, *A Design for Maintaining Maritime Superiority, Version 2.0*, December 2018,

> Our fundamental force element right now in many instances is the [individual] carrier strike group. We're going to scale up so our fundamental force element for fighting is at the fleet[-wide] level, and the [individual] strike groups plug into those [larger] numbered fleets. And they will be, the strike groups and the fleet together, will be operating in a distributed maritime operations way.[38]

In its FY2020 budget submission, the Navy states that "MUSV and LUSV are key enablers of the Navy's Distributed Maritime Operations (DMO) concept, which includes being able to forward deploy (alone or in teams/swarms), team with individual manned combatants or augment battle groups."[39] The Navy stated in its FY2020 budget submission that a Navy research and development effort focusing on concept generation and concept development (CG/CD) will

> Continue CG/CD development efforts that carry-over from FY[20]19: Additional concepts and CONOPs [concepts of operation] to be developed in FY[20]20 will be determined through the CG/CD development process and additional external factors. Concepts under consideration include Unmanned Systems in support of DMO, Command and Control in support of DMO, Offensive Mine Warfare, Targeting in support of DMO, and Advanced Autonomous/Semi-autonomous Sustainment Systems.[40]

The Navy also stated in its FY2020 budget submission that a separate Navy research and development effort for fleet experimentation activities will include activities that "address key DMO concept action plan items such as the examination of Fleet Command and Maritime Operation Center (MOC) capabilities and the employment of unmanned systems in support of DMO."[41]

A May 16, 2019, press report states

> The Deputy Chief of Naval Operations for Warfare Systems said Wednesday [May 15] he thinks the upcoming Force Structure Assessment (FSA) will focus on smaller surface combatants as the service looks to build up to a 355-ship Navy.
>
> "I certainly don't see that [FSA fleet] number going down, but it is going to be more reflective of the DMO [Distributed Maritime Operations] construct and it includes not just the battle force ships, but the logistics ships, the trainers, the maritime operations centers, everything that we pull together to keep this machine running," Vice Adm. William Merz said during an event at the Center for Strategic and International Studies.
>
> "What we think is going to happen with this FSA is there will be more emphasis on the smaller surface combatants, mostly because the frigate looks like it's coming along very well and it's going to be more lethal than we had planned," Merz said.

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pp. 8, 10.

[38] (Chief of Naval Operations Admiral John Richardson, as quoted in Megan Eckstein, "Navy Planning for Gray-Zone Conflict; Finalizing Distributed Maritime Operations for High-End Fight," *USNI News*, December 19, 2018.)

[39] *Department of Defense, Fiscal Year (FY) 2020 Budget Estimates, Navy Justification Book Volume 2 of 5, Research, Development, Test & Evaluation, Navy, Budget Activity 4*, March 2019, p. 202. See also Kevin Eyer and Steve McJessy, "Operationalizing Distributed Maritime Operations," Center for International Maritime Security (CIMSEC), March 5, 2019; Christopher H. Popa, et al., *Distributed Maritime Operations and Unmanned Systems Tactical Employment*, Naval Postgraduate School, June 2018, 171 pp. (Systems Engineering Capstone Report); Lyla Englehorn, *Distributed Maritime Operations (DMO) Warfare Innovation Continuum (WIC) Workshop September 2017 After Action Report*, Naval Postgraduate School, December 2017, 99 pp.

[40] *Department of Defense, Fiscal Year (FY) 2020 Budget Estimates, Navy Justification Book Volume 2 of 5, Research, Development, Test & Evaluation, Navy, Budget Activity 4*, March 2019, p. 1385. See also pp. 1382, 1384, 1443, 1445.

[41] *Department of Defense, Fiscal Year (FY) 2020 Budget Estimates, Navy Justification Book Volume 4 of 5, Research, Development, Test & Evaluation, Navy Budget Activity 6*, March 2019, p. 290.

> Merz explained the likely outcome by comparing it to how Rear Adm. Ron Boxall, director of surface warfare (N96), talks about how the Navy has too many large surface combatants and needs to get more balanced.
>
> "When you look at the lethality of the frigate, yeah that makes sense. So we'll see how the FSA handles the lethality of that – and then how does that bleed over into the other accounts," Merz said….
>
> Merz revealed there will also be "a hard look at the logistics side" because while some logistics ships count as battle force ships some do not. He said the FSA will make an opinion on the non-battle force logistics vessels as well because it does not limit itself to those strict definitions.
>
> The FSA will also take into account the evolution of the air wing, the length of the air wing, the range of the air wing on carriers and amphibious vessels, and how the Navy will cover its responsibilities.[42]

Expeditionary Advanced Base Operations (EABO)

In parallel with DMO, the Marine Corps has developed a new operational concept, called Expeditionary Advanced Base Operations (EABO), that appears related to the earlier-quoted passage from the *Commandant's Planning Guidance* about changing the amphibious lift goal and the amphibious force architecture. Regarding EABO, the *Commandant's Planning Guidance* states the following (emphasis as in the original):

> The 2016 *Marine Corps Operating Concept* (MOC) predates the current set of national strategy and guidance documents, but it was prescient in many ways. It directed partnering with the Navy to develop two concepts, Littoral Operations in a Contested Environment (LOCE) and Expeditionary Advanced Base Operations (EABO) that nest exceptionally well with the current strategic guidance. It is time to move beyond the MOC itself, however, and partner with the Navy to complement LOCE and EABO with classified, threat-specific operating concepts that describe how naval forces will conduct the range of missions articulated in our strategic guidance….
>
> **EABO complement the Navy's Distributed Maritime Operations Concept and will inform how we approach missions against peer adversaries**….
>
> EABO are driven by the aforementioned adversary deployment of long-range precision fires designed to support a strategy of "counter-intervention" directed against U.S. and coalition forces. EABO, as an operational concept, enables the naval force to persist forward within the arc of adversary long-range precision fires to support our treaty partners with combat credible forces on a much more resilient and difficult to target forward basing infrastructure. EABO are designed to restore force resiliency and enable the persistent naval forward presence that has long been the hallmark of naval forces. Most significantly, EABO reverse the cost imposition that determined adversaries seek to impose on the joint force. EABO guide an apt and appropriate adjustment in future naval force development to obviate the significant investment our adversaries have made in long-range precision fires. Potential adversaries intend to target our forward fixed and vulnerable bases, as well as deep water ports, long runways, large signature platforms, and ships. By developing a new expeditionary naval force structure that is not dependent on concentrated, vulnerable, and expensive forward infrastructure and platforms, we will frustrate enemy efforts to separate U.S. Forces from our allies and interests. EABO enable naval forces to partner

[42] Rich Abott, "Merz Says FSA To Emphasize Smaller Ships," *Defense Daily*, May 16, 2019.

> and persist forward to control and deny contested areas where legacy naval forces cannot be prudently employed without accepting disproportionate risk….
>
> In February of 2019, the Commandant and Chief of Naval Operations co-signed the concept for EABO. The ideas contained in this document are foundational to our future force development efforts and are applicable in multiple scenarios.[43]

Issues for Congress

COVID-19 (Coronavirus) Impact on Shipbuilding Programs

One issue for Congress concerns the potential impact of the COVID-19 (coronavirus) situation on the execution of Navy (and Coast Guard) shipbuilding programs. The potential for the COVID-19 (coronavirus) situation to impact work efforts is not unique to shipbuilding—it is a possibility faced by many if not all DOD contractors. The discussion in this report focuses on potential impacts on Navy (and Coast Guard) shipbuilding programs.[44] Aspects of the discussion below might also apply to impacts of the COVID-19 (coronavirus) situation on government-operated and private-sector shipyards that overhaul, repair, and maintain Navy (and Coast Guard) ships, and their associated supplier firms.

Potential Impact

Operations at shipbuilders and associated supplier firms could be impacted by the COVID-19 (coronavirus) situation if workers remain home rather than report to work because they are either positive for the virus, are remaining home as part of an effort to maintain social distancing, are taking care of children who have been sent home from school for the same reason, or are taking care of family members who have become ill as a result of the virus. Impacts on operations at shipbuilding supplier firms could affect operations at the shipyards, even if staffing at the shipyards themselves is not affected, due to reduced or delayed deliveries to the shipyards of supplier-provided components and materials.

Delays in building ships and fabricating their components could put shipyards and supplier firms at risk of not being able to meet their contractual obligations, which in turn could affect their financial situations. Shipyard and supplier-firm workers who report to work could face a risk of exposure to the virus, while those who are sent home by their employer could face a loss of income for a period lasting weeks or months.

Although all U.S. Navy (and Coast Guard) shipbuilding programs could be affected, one shipbuilding program of potential particular note in this connection is Columbia-class ballistic missile submarine program, due to the program's high priority (it is the Navy's top program priority), the program's tight schedule for designing and building the lead boat in time for the boat to be ready to conduct its scheduled first strategic nuclear deterrent patrol in 2031, and the potential consequences for the nation's strategic nuclear deterrent posture if the lead boat is not

[43] U.S. Marine Corps, *Commandant's Planning Guidance, 38th Commandant of the Marine Corps*, undated, released July 2019, pp. 9, 11, 19. See also Jim Lacey, "The 'Dumbest Concept Ever' Just Might Win Wars," *War on the Rocks*, July 29, 2019; Megan Eckstein, "How to Seize Islands, Set Up a Forward Refueling Point: Marine Corps Recipes for Exspeditionary Operations," *USNI News*, September 13, 2019.

[44] CRS reports on Coast Guard shipbuilding programs include CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by Ronald O'Rourke, and CRS Report RL34391, *Coast Guard Polar Security Cutter (Polar Icebreaker) Program: Background and Issues for Congress*, by Ronald O'Rourke.

ready in time to conduct that patrol. The COVID-19 (coronavirus) risk to the schedule for designing and building the lead boat in the Columbia-class program is discussed in the CRS report on that program.[45]

A March 14, 2020, press report stated:

> As Italy's coronavirus crisis worsens, state shipbuilder Fincantieri has suspended operations for two weeks at its Italian facilities.
>
> The announcement on Friday came as Italian authorities reported Italy's death toll from the virus had reached 1,266, while the total number of cases reached 17,660. This week, the Italian government placed the entire country under lockdown, restricting travel unless for work reasons and shutting down most shops as it attempts to slow the spread of the virus.
>
> Fincantieri said that following a request from unions, it would suspend production in Italy from March 16 to March 29.
>
> Fincantieri tried to reduce its exposure to the virus through teleworking and halting of business travel by staff.
>
> Italy's other major defense company, Leonardo, said this week it could not rule out the "temporary, partial and targeted suspension of operations of certain departments within production sites."[46]

A March 16, 2020, press report stated:

> U.S. shipyards are adjusting to meet the new coronavirus threat, but work continues across the country.
>
> In the wake of news that Fincantieri's shipyards in Italy has suspended operations for two weeks to help stem the spread of the illness, US shipyards have responded with more modest changes: suspending international travel, limiting domestic travel and suspending participation in conferences and trade shows for shipyard employees.
>
> Yards are also changing leave policies to allow workers time to adjust to restrictions that have closed schools and businesses across the country.
>
> While to date the changes have been minor, several company officials told Defense News that the situation was evolving and more could be coming down the pike as the government responds to the unfolding crisis that has rocked the country over the past week.[47]

Potential oversight questions for Congress include the following:

- How might the COVID-19 (coronavirus) situation affect Navy (and Coast Guard) shipbuilding programs?
- How well do Navy (and Coast Guard) officials understand these potential impacts?
- What are Navy (and Coast Guard) officials doing to anticipate, monitor, and respond to this situation?

[45] See CRS Report R41129, *Navy Columbia (SSBN-826) Class Ballistic Missile Submarine Program: Background and Issues for Congress*, by Ronald O'Rourke.

[46] Tom Kington, "Fincantieri Suspends Operations amid Coronavirus Crisis," *Defense News*, March 14, 2020.

[47] David B. Larter and Courtney Mabeus, "With Coronavirus on the Loose, US Shipyards Make Adjustments But Keep Building," *Defense News*, March 16, 2020.

Potential Assistance to Shipyards and Supplier Firms

Potential options for Congress for providing assistance to affected shipyards and supplier firms could take various forms. Some past instances of assistance relating to shipbuilding include the following:

- Following Hurricane Katrina in August 2005, Congress provided $1.7 billion in reallocated emergency supplemental appropriations to pay estimated higher shipbuilding costs for 11 Navy ships under construction at the Ingalls shipyard in Pascagoula, MS, and the Avondale shipyard upriver from New Orleans, LA.[48]
- The American Recovery and Reinvestment Act (ARRA) of 2009 (H.R. 1/P.L. 111-5 of February 17, 2009), which was enacted in response to the 2008-2009 recession, appropriated $100 million for the Maritime Administration (MARAD) to be used for making supplemental grants to small shipyards as authorized under Section 3508 of the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 (S. 3001/P.L. 110-417 of October 14, 2008) or 46 U.S.C. 54101.[49]
- Following Hurricane Michael in October 2018, the Department of Homeland Security (DHS), of which the Coast Guard is a part, announced on October 11, 2019, that DHS had granted extraordinary contractual relief to Eastern Shipbuilding Group (ESG) of Panama City, FL, the builder of the first of the Coast Guard's new Offshore Patrol Cutters (OPCs), under P.L. 85-804 as amended (50 U.S.C. 1431-1435). P.L. 85-804, originally enacted in 1958, authorizes certain federal agencies to provide certain types of extraordinary relief to contractors who are encountering difficulties in the performance of federal contracts or subcontracts relating to national defense.[50] ESG reportedly submitted

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[48] See CRS Report RS22239, *Emergency Supplemental Appropriations for Hurricane Katrina Relief*, by Keith Bea, August 22, 2006, p. 6. The report states:

> Citing the need for "special oversight" of these shipbuilding funds dedicated to cover property damage, cleanup, idle payroll, and business disruption (that may also be covered by shipbuilders' insurance), the appropriators added report language requiring that the Navy or Army, as applicable, submit a report to the Appropriations Committees "certifying" that the costs were related to the hurricanes and would not be paid for by FEMA or the shipbuilders' insurers.
>
> (U.S. House, Conference Committees 2005, *Making Appropriations for the Department of Defense for the Fiscal Year Ending September 30, 2006, and for Other Purposes*, conference report to accompany H.R. 2863, H.Rept. 109-359, 109th Cong., 1st sess. [Washington: GPO, 2005], p. 496.)

See also CRS Report RL33298, *FY2006 Supplemental Appropriations: Iraq and Other International Activities; Additional Hurricane Katrina Relief*, Paul M. Irwin, Coordinator, Larry Nowels, Coordinator, June 15, 2006, pp. 59-66; and CRS Report RL33197, *Reallocation of Hurricane Katrina Emergency Appropriations: Defense and Other Issues*, Coordinated by Amy Belasco, December 15, 2005, pp. 9-14. (These CRS reports are out of print and available for congressional clients from the author of this report.)

[49] Section 3508 of P.L. 110-417 amended the U.S. Code to add Section 54101 to Title 46, which establishes a program for assistance for small shipyards and maritime communities.

[50] 50 U.S.C. 1431 states in part:

> The President may authorize any department or agency of the Government which exercises functions in connection with the national defense, acting in accordance with regulations prescribed by the President for the protection of the Government, to enter into contracts or into amendments or modifications of contracts heretofore or hereafter made and to make advance payments thereon, without regard to other provisions of law relating to the making, performance, amendment, or modification of contracts, whenever he deems that such action would facilitate the national defense. The authority conferred by this section shall not be utilized to obligate the United States in an

a request for extraordinary relief on June 30, 2019, after ESG's shipbuilding facilities were damaged by Hurricane Michael,[51]

The past instances listed above do not necessarily represent the full range of options available to Congress for assisting shipyards and supplier firms—additional options might be available through the Defense Production Act (DPA) or other federal authorities.[52]

Letter to DOD from Members of Congress from Maine

On March 19, 2020, Members of Congress from Maine sent a letter to the Secretary of Defense and the Acting Secretary of the Navy "about the stability of the defense industrial base as the whole nation combats the current novel coronavirus (COVD-19) outbreak." For the text of this letter, see **Appendix J**.

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

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.

As discussed earlier, the Navy's FY2021 budget submission presents the aircraft carrier CVN-81 as a ship that Congress procured in FY2020. Consistent with congressional action on the Navy's FY2019 budget regarding the procurement of CVN-81 (see **Appendix I**), this CRS report treats CVN-81 as a ship that Congress procured (i.e., authorized and provided procurement funding for) in FY2019.

As also discussed earlier, the Navy's FY2021 budget submission presents LPD-31, an LPD-17 Flight II amphibious ship, as a ship requested for procurement in FY2021, and the amphibious assault ship LHA-9 as a ship projected for procurement in FY2023. Consistent with congressional action on the Navy's FY2020 budget regarding the procurement of LPD-31 and LHA-9 (see

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amount in excess of $50,000 without approval by an official at or above the level of an Assistant Secretary or his Deputy, or an assistant head or his deputy, of such department or agency, or by a Contract Adjustment Board established therein.

For more on P.L. 85-804 as amended, see CRS Report 76-261, *Extraordinary Contractual Relief Under Public Law 85-804*, April 28, 1976, by Andrew C. Mayer. The report was prepared at the request of the House Armed Services Committee and converted by the committee into a committee print (70-905 O), dated May 10, 1976, that can be viewed at https://ufdc.ufl.edu/AA00022546/00001/1j. See also David H. Peirez, "Public Law 85-804: Contractual Relief for the Government Contractor," *Administrative Law Review*, vol. 16 (Summer 1964): 248-264, accessed October 11, 2019, at https://www.jstor.org/stable/40708469; and "Presidential Power: Public Law 85-804 (50 U.S.C. §§ 1431-35)," Brennan Center for Justice, undated, accessed October 11, 2019, at https://www.brennancenter.org/sites/default/files/analysis/50%20USC%201431-1435.pdf. (Although it is undated, it appears to have been written no earlier than 2014, as it includes three references to the year 2014, including one that states, "As of 2014….") The text of P.L. 85-804 as originally enacted is posted at https://www.govinfo.gov/content/pkg/STATUTE-72/pdf/STATUTE-72-Pg972.pdf.

[51] For more on the extraordinary contractual relief provided to ESG under P.L. 85-804, see CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by Ronald O'Rourke.

[52] For more on the DPA in the context of the COV-19 (coronavirus) situation, see CRS Report R43767, *The Defense Production Act of 1950: History, Authorities, and Considerations for Congress*, by Michael H. Cecire and Heidi M. Peters, and CRS Insight IN11231, *The Defense Production Act (DPA) and COVID-19: Key Authorities and Policy Considerations*, by Michael H. Cecire and Heidi M. Peters. See also Scott F. Roybal and Laura A. Alexander, "Coronavirus and its Implications for Government Contractors," *National Law Review*, March 9, 2020.

Appendix I), this CRS report treats LPD-31 and LHA-9 as ships that Congress procured (i.e., authorized and provided procurement funding for) 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 and use of Congress's power of the purse under Article 1 of the Constitution, and for maintaining Congress as a co-equal branch of government relative to the executive branch?

Reprogramming of FY2020 Funding for LHA-9 and EPF Ship

On February 13, 2020 (i.e., three days after submitting its proposed FY2021 defense budget), the Administration submitted a reprogramming action that transfers about $3.8 billion in DOD funding to Department of Homeland Security (DHS) counter-drug activities, commonly reported to mean the construction of the southern border wall. Included in this action is $650 million that Congress appropriated in FY2020 for the amphibious assault ship LHA-9, and $261 million that Congress appropriated in FY2020 for an expeditionary fast transport (EPF) ship.[53] The $650 million represents about 17% (i.e., about one-sixth) of the estimated cost of LHA-9; the $261 million is the full procurement cost of the EPF.

The reprogramming action acknowledges that LHA-9 and the EPF ship are congressional special interest items, meaning items that Congress funded at levels above what DOD had requested. (The Navy's FY2020 budget submission requested no funding for either ship.) The reprogramming action characterizes the $650 million as "early to current programmatic need," even though it would be needed for a ship whose construction would begin in FY2020. In discussing its FY2021 budget submission, Navy officials characterize LHA-9 not as ship whose procurement the Navy is proposing to delay from FY2020 to FY2023, but as a ship whose procurement the Navy is proposing to accelerate from FY2024 (the ship's procurement date under the Navy's FY2020 budget submission) to FY2023. The reprogramming action characterizes the EFP as "excess to current [Navy] programmatic need. The procurement exceeds the [Navy's] program-of-record requirement."

Potential oversight issues for Congress include the following:

[53] Department of Defense, Reprogramming action (form DD 1415), DOD Serial Number FY 20-01 RA, February 13, 2020, page 3 of 5.

- By reprogramming the funding for LHA-9 and the EPF ship to another purpose, is DOD, in its FY2021 budget submission, disregarding the expressed intent of Congress regarding the procurement of these two ships?
- If so, could this establish a precedent for DOD or other parts of the executive branch in the future to disregard the intent of Congress regarding the procurement or program-initiation dates for other Navy ships, other Navy programs, other DOD programs, or other federal programs? What implications might that have for the preservation and use of Congress's power of the purse under Article 1 of the Constitution, and for maintaining Congress as a co-equal branch of government relative to the executive branch?

Delay in Submission of FY2021 30-year Shipbuilding Plan

Another issue for Congress concerns the delay in the submission of the Navy's FY2021 30-year (FY2021-FY2050) shipbuilding plan, and the impact this delay may have on Congress's ability to assess and mark up the Navy's proposed FY2021 budget. 10 U.S.C. 231 states that DOD "shall include" the 30-year shipbuilding plan "with the defense budget materials for a fiscal year." Navy officials have stated that the 30-year shipbuilding plan, like the INFSA, is being reviewed by the Office of the Secretary of Defense.[54] In late-February, Acting Secretary of the Navy Thomas Modly said it could be submitted within "a couple of months."[55]

The 30-year shipbuilding plan is intended to provide Congress with supporting information for assessing and marking up the Navy's proposed shipbuilding program. The discussion of the 30-year plan in this CRS report is one reflection of the role that the 30-year shipbuilding plan plays in that regard.

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 assessing the cost and prospective affordability of the plan. As reflected in this CRS report, CBO's report assessing the Navy's 30-year shipbuilding plan 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 lead to a delay in the submission of CBO's report.

CRS and CBO testified regarding 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.[56] 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

[54] 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.

[55] See, for example, Mallory Shelbourne, "Modly Says He Expects to Submit Shipbuilding Plan 'In a Couple of Months,'" *Inside Defense*, February 27, 2020.

[56] See 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, 8 pp., and 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, 7 pp.

> the Future Years Defense Plan (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.[57]

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.[58]

Adequacy of Proposed FY2021 Shipbuilding Budget and Five-Year Shipbuilding Plan

Another issue for Congress concerns the adequacy of the proposed FY2021 shipbuilding budget, which requests the procurement of seven new ships, and the FY2021 five-year shipbuilding plan, which includes 42 new ships, relative to the Navy's goal of attaining a fleet of 355 ships within 10 years. Potential oversight issues for Congress include the following:

- Would the procurement of seven new ships in FY2021, and a total of 42 ships over the five-year period FY2021-FY2025, be consistent with a goal of attaining a fleet of 355 ships within 10 years? In conjunction with this level of new ship procurement, to what degree would the Navy need to extend the service lives of existing ships to attain a fleet of 355 new ships within 10 years? How would the mix of that 355-ship fleet compare to the mix called for in the 2016 FSA (shown in **Table 1**)?

[57] 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.

[58] 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.

- Within the Navy's FY2021 budget top line and its projected funding levels through FY2025, does the Navy's FY2021 budget submission strike the proper balance between funding for new ship procurement and funding for other Navy priorities, such as restoring eroded ship readiness and improving fleet lethality? Is there a mismatch between the Navy's budget top line and the Navy's desire to achieve a 355-ship fleet within 10 years while also adequately funding other Navy priorities?

How INFSA Will Change Fleet Architecture, 355-Ship Goal, Mix of Ships to Be Procured, and Distribution of Shipbuilding Work

Another issue for Congress is how the INFSA will change the Navy's fleet architecture, the Navy's current 355-ship force-level goal, the mix of Navy ships to be procured, and the distribution of Navy shipbuilding work among the nation's shipyards.

Affordability of 30-Year Shipbuilding Plan

As mentioned earlier, the Navy has not yet submitted its FY2021 30-year (FY2021-FY2050) shipbuilding plan. As a placeholder pending the submission of that plan, the discussion below of specific points regarding the affordability of the Navy's 30-year shipbuilding plan is based on the Navy's FY2020 30-year plan.

Overview

Another oversight issue for Congress has concerned the prospective affordability of the Navy's 30-year shipbuilding plan. This issue has been a matter of oversight focus for several years, and particularly since the enactment in 2011 of the Budget Control Act, or BCA (S. 365/P.L. 112-25 of August 2, 2011). Aspects of this issue could change if the INFSA shifts the Navy to a new fleet architecture and a changed mix of ships to be procured in coming years. The discussion below is based on the Navy's current fleet architecture.

Based on the Navy's current fleet architecture, observers have been particularly concerned about the 30-year shipbuilding plan's prospective affordability during the decade or so from the mid-2020s through the mid-2030s, when the plan calls for procuring Columbia-class ballistic missile submarines as well as replacements for large numbers of retiring attack submarines, cruisers, and destroyers.[59] **Figure 2** shows, in a graphic form, the Navy's estimate of the annual amounts of funding that would be needed to implement the Navy's FY2020 30-year shipbuilding plan. The figure shows that during the period from the mid-2020s through the mid-2030s, the Navy estimates that implementing the FY2020 30-year shipbuilding plan would require roughly $24 billion per year in shipbuilding funds.

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

[59] The Navy's 30-year plans in recent years have spotlighted for policymakers the substantial increase in Navy shipbuilding funding that would be required to implement the 30-year plan during the decade or so from the mid-2020s through the mid-2030s. As discussed in CRS testimony in 2011, a key function of the 30-year shipbuilding plan is to alert policymakers well ahead of time to periods of potentially higher funding requirements for Navy shipbuilding. (See 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, 8 pp.)

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.[60] To help generate some of this funding from within the Navy's own budget, 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.[61]

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 Under Secretary of the Navy Thomas Modly as stating in a speech on that date: "I will tell you it is going 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.'"[62]

An October 27, 2019, press report, reporting on remarks made by 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.[63]

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.

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

[61] 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.

[62] Justin Katz, "Modly Acknowledges 355 Ships Won't Happen in 'Reasonable' Amount of Time," Inside Defense, September 16, 2019.

[63] Otto Kreisher, "Modly Doubts Future Budgets Will Allow for 355-Ship Fleet," *Seapower*, October 27, 2019.

> 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."[64]

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.[65]

Concern Regarding Potential Impact of Columbia-Class Program

As discussed in the CRS report on the Columbia-class program,[66] the Navy since 2013 has identified the Columbia-class program as its top program priority, meaning that it is the Navy's intention to fully fund this program, if necessary at the expense of other Navy programs, including other Navy shipbuilding programs. This led to concerns that in a situation of finite Navy shipbuilding budgets, funding requirements for the Columbia-class program could crowd out funding for procuring other types of Navy ships. These concerns in turn led to the creation by Congress of the National Sea-Based Deterrence Fund (NSBDF), a fund in the DOD budget that is intended in part to encourage policymakers to identify funding for the Columbia-class program from sources across the entire DOD budget rather than from inside the Navy's budget alone.

Several years ago, when concerns arose about the potential impact of the Columbia-class program on funding available for other Navy shipbuilding programs, the Navy's shipbuilding budget was roughly $14 billion per year, and the roughly $7 billion per year that the Columbia-class program is projected to require from the mid-2020s to the mid-2030s (see **Figure 2**) represented roughly one-half of that total. With the Navy's shipbuilding budget having grown in more recent years to a total of roughly $24 billion per year, the $7 billion per year projected to be required by the Columbia-class program during those years does not loom proportionately as large as it once did in the Navy's shipbuilding budget picture. Even so, some concerns remain regarding the potential impact of the Columbia-class program on funding available for other Navy shipbuilding programs.

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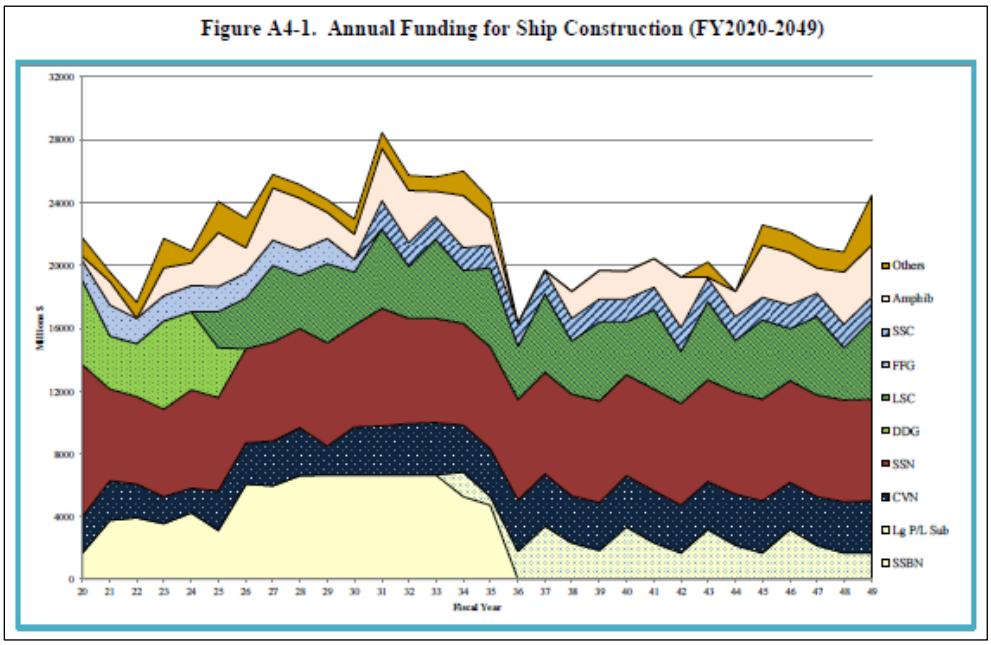
[64] Ben Werner, "Admiral: Navy Can Afford to Field a 310-Ship Fleet, Not 355," *USNI News*, October 28, 2019. See also Rich Abott, "Navy Says Current Funding Only Supports 310 Ships," *Defense Daily*, October 28, 2019; Paul McLeary, "Navy May Scrap Goal of 355 Ships; 310 Is Likely," *Breaking Defense*,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

[65] 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 Abott, "CNO: Ship Count Will Not Include Unmanned; Bigger Topline Needed For Fleet Goal," *Defense Daily*, January 15, 2020.

[66] CRS Report R41129, *Navy Columbia (SSBN-826) Class Ballistic Missile Submarine Program: Background and Issues for Congress*, by Ronald O'Rourke.

Figure 2. Navy Estimate of Funding Requirements for FY2020 30-Year Plan

Constant FY2019 dollars, in millions



Source: U.S. Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, Figure A4-1 on page 18.

Potential for Cost Growth on Navy Ships

If one or more Navy ship designs turn out to be more expensive to build than the Navy estimates, then the projected funding levels shown in **Figure 2** would not be sufficient to procure all the ships shown in the 30-year shipbuilding plan. As detailed by CBO[67] and GAO,[68] lead ships in Navy shipbuilding programs in many cases have turned out to be more expensive to build than the Navy had estimated. Ship designs that can be viewed as posing a risk of being more expensive to build than the Navy estimates include Gerald R. Ford (CVN-78) class aircraft carriers, Columbia-class ballistic missile submarines, Virginia-class attack submarines equipped with the Virginia Payload Module (VPM), Flight III versions of the DDG-51 destroyer, FFG(X) frigates, LPD-17 Flight II amphibious ships, and John Lewis (TAO-205) class oilers, as well as other new classes of ships that the Navy wants to begin procuring years from now.

CBO Estimate

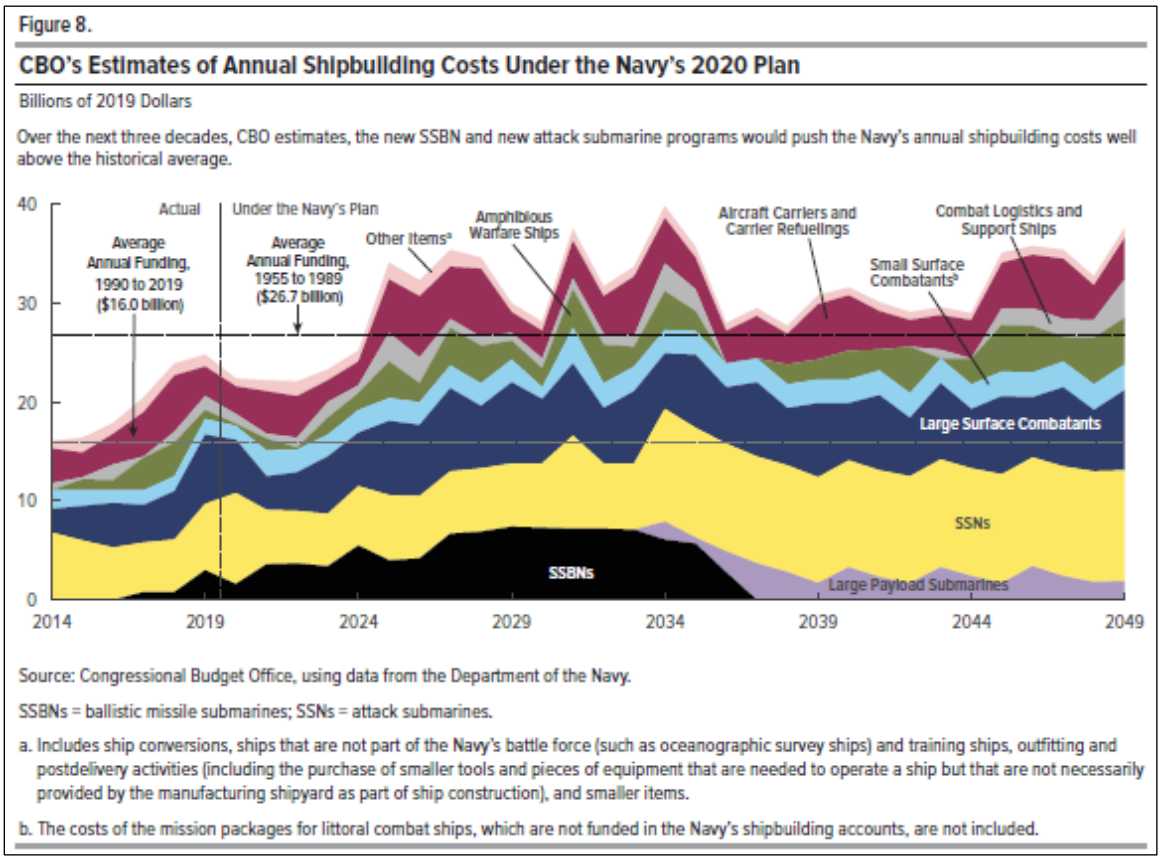
As mentioned earlier, the statute that requires the Navy to submit a 30-year shipbuilding plan each year (10 U.S.C. 231) also requires CBO to submit its own independent analysis of the potential cost of the 30-year plan (10 U.S.C. 231[d]). **Figure 3** shows, in a graphic form, CBO's estimate of the annual amounts of funding that would be needed to implement the Navy's FY2020 30-year shipbuilding plan. This figure can be compared to the Navy's estimate of its FY2020 30-year plan as shown in **Figure 2**.

[67] See Congressional Budget Office, *An Analysis of the Navy's Fiscal Year 2019 Shipbuilding Plan*, October 2018, p. 25, including Figure 10.

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

Figure 3. CBO Estimate of Funding Requirements for 30-Year Plan

Constant FY2019 dollars, in billions



Source: Congressional Budget Office, *An Analysis of the Navy's Fiscal Year 2020 Shipbuilding Plan*, October 2019, Figure 8 on page 16.

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. Consistent with that past pattern, as shown in **Table 5**, CBO's estimate of the cost to implement the Navy's FY2020 30-year shipbuilding plan is about 31% higher than the Navy's estimated cost for the FY2020 plan. More specifically, as shown in the table, CBO estimated that the cost of the first 10 years of the FY2020 30-year plan would be about 2% higher than the Navy's estimate; that the cost of the middle 10 years of the plan would be about 21% higher than the Navy's estimate; and that the cost of the final 10 years of the plan would be about 41% higher than the Navy's estimate.[69]

Treatment of Inflation

The growing divergence between CBO's estimate and the Navy's estimate as one moves from the first 10 years of the 30-year plan to the final 10 years of the plan is due in part to a technical difference between CBO and the Navy regarding the treatment of inflation. This difference compounds over time, making it increasingly important as a factor in the difference between CBO's estimates and the Navy's estimates the further one goes into the 30-year period. In other

[69] Congressional Budget Office, *An Analysis of the Navy's Fiscal Year 2020 Shipbuilding Plan*, October 2019, Table 4 on page 13.

words, other things held equal, this factor tends to push the CBO and Navy estimates further apart as one proceeds from the earlier years of the plan to the later years of the plan.[70]

Table 5. Navy and CBO Estimates of Cost of 30-Year Shipbuilding Plan

Funding for new-construction ships, in billions of constant FY2019 dollars

	First 10 years of the plan	Middle 10 years of the plan	Final 10 years of the plan	Entire 30 years of the plan
Navy estimate	20.3	24.4	21.8	22.0
CBO estimate	20.7	29.7	30.7	28.8
% difference between Navy and CBO estimates	2	21	41	31

Source: Congressional Budget Office, *An Analysis of the Navy's Fiscal Year 2020 Shipbuilding Plan,* October 2019, Table 4 on page 13.

Notes: The figures shown for "% difference" are those presented in the CBO report, which are derived from dollar figures for the Navy and CBO estimates that were subsequently rounded off by CBO for presentation in its report. This is why the figure for "% difference" for the middle 10 years of the plan shows as 21% rather than 22%.

Designs of Future Classes of Ships

The growing divergence between CBO's estimate and the Navy's estimate as one moves from the first 10 years of the 30-year plan to the final 10 years of the plan is also due to differences between CBO and the Navy about the costs of certain ship classes, particularly classes that are projected to be procured starting years from now. The designs of these future ship classes are not yet determined, creating more potential for CBO and the Navy to come to differing conclusions regarding their potential cost.

For the FY2020 30-year plan, the largest source of difference between CBO and the Navy regarding the costs of individual ship classes is a new class of SSNs that the Navy wants to begin procuring in FY2031 as the successor to the Virginia-class SSN design. This new class of SSNs, CBO says, accounts for 34% of the difference between the CBO and Navy estimates for the FY2020 30-year plan, in part because there are a substantial number of these SSNs in the plan, and because those ships occur in the latter years of the plan, where the effects of the technical difference between CBO and the Navy regarding the treatment of inflation show more strongly.

The second-largest source of difference between CBO and the Navy regarding the costs of individual ship classes is a new class of large surface combatant (i.e., cruiser or destroyer) that the Navy wants to begin procuring in FY2025, which accounts for 33% of the difference, for reasons that are similar to those mentioned above for the new class of SSNs.

The third-largest source of difference is the new class of frigates (FFG[X]s) that the Navy wants to begin procuring in FY2020, which accounts for 10% of the difference.

The remaining 23% of difference between the CBO and Navy estimates is accounted for collectively by several other shipbuilding programs, each of which individually accounts for

[70] For additional discussion of how CBO estimates the costs of new Navy ships, see Congressional Budget Office, *How CBO Estimates the Cost of New Ships*, April 2018, 6 pp.

between 1% and 4% of the difference. The Columbia-class program, which accounts for 4% of the difference, is one of the programs in this final group.[71]

Sustainment Cost

In addition to the issue of the cost to build new ships, the Navy in its FY2020 30-year shipbuilding plan highlighted a concern over the potential costs to sustain a larger fleet. On this issue, the FY2020 30-year shipbuilding plan states in part

> Coincident with the relatively new dynamic of purchasing more ships to grow the force instead of simply replacing ships or shrinking the force, is the responsibility to "own" the additional inventory when it arrives.
>
> Consistent annual funding in the shipbuilding account is foundational for an efficient industrial base in support of steady growth and long-term maintenance planning, but equally important is the properly phased, additional funding needed for operations and sustainment accounts as each new ship is delivered—the much larger fiscal burden over the life of a ship and the essence of the challenge to remain balanced across the three integral elements of readiness–capability–capacity. Because the Navy [until recently] has been shrinking not growing, and because of the disconnected timespan from purchase to delivery, often five years or more and often beyond the FYDP, there is risk of underestimating the aggregate sustainment costs looming over the horizon that must now be carefully considered in fiscal forecasting.
>
> For a ship, the rough rule of thumb for cost is 30 percent for procurement and 70 percent for operating and sustainment; for example, a ship that costs $1B to buy costs $3.3B to own, amortized over its lifespan. Accordingly, multi-ship deliveries can add hundreds of millions of dollars to a budget year, and then require the same funding per year thereafter, compounded by additional deliveries in subsequent years and only offset by ship retirements, which lag deliveries when growing the force. A similar dynamic occurs when the life of a ship is extended. Sustainment resources programmed to shift from a retiring ship to a new ship must now stay in place – for the duration of the extension. The burden continues to grow until equilibrium is reached at the desired higher inventory, when deliveries match retirements and all resourcing accounts reach steady-state at a higher, enduring sustainment cost.
>
> For perspective, the current budget, among the largest ever, supports a modern fleet of approximately 300 ships, nearly 20 percent fewer than the goal of 355. The battle force inventory… rises from 301 ships in FY2020 to [a projected figure of] 314 ships in FY2024, and then 355 in FY2034. The programmed sustainment cost… is $24B [billion] in FY2020 and rises to $30B [billion in FY2024 in TY$ [then-year dollars]. When the battle force inventory reaches 355 in FY2034, [the] estimated cost to sustain that fleet will approach $40B (TY$), 32% higher than in FY2024. For now, included in this sustainment estimate are only personnel, planned maintenance, and some operations; representing those costs tied directly to owning and operating a ship, easily modeled today, and already line-item accounted for in the budget. Equally important additional costs, but not yet included in the future estimate, are those not easily associated with individual ships and require complex modeling for long-term forecasting (beyond 3 to 5 years), such as the balance of the operations accounts (market and schedule driven), modernization and ordnance (threat and technology driven), infrastructure and training (services spread across many ships), aviation detachments, networks and cyber support, plus others….
>
> Less of a challenge when shrinking the force, the Navy is now working towards developing the complex model needed to capture indirect costs for growing the force. Until then, macro

[71] Congressional Budget Office, *An Analysis of the Navy's Fiscal Year 2020 Shipbuilding Plan*, October 2019, Table A-1 on page 29.

> ratios are helpful in estimating rough orders of magnitude beyond the FYDP and for identifying future areas of concern. Similar to procurement, estimates will be less precise deeper into the plan. Recovering from the long-term investment imbalance has proven to be costly, particularly in the readiness accounts. As readiness becomes more accurately defined, the modeling will improve and so will the ability to more accurately forecast. However, no matter the method, the anticipated cost of sustaining the proper mix of 355 ships is anticipated to be substantial, and reform efforts and balanced scalability will continue to be the drivers going forward.[72]

A May 15, 2019, press report states:

> The service [the navy] is also getting some sobering feedback on how much it will cost to sustain a significantly larger fleet— something it hasn't had to do in decades.
>
> As the Navy plans for more ships, Vice Adm. William Merz Deputy Chief Of Naval Operations For Warfare Systems said Wednesday, "we're also coming to realize what that is going to cost, and how you're going to sustain today's fleet while continuing to grow." The planning process is "much more challenging than anyone realized," he said, "but we're much smarter about our business" than just a few years ago….
>
> … taking the fleet from under 300 ships to at least 355 is a daunting task, Merz said at the Center for Strategic and International Studies. "We don't have the complex modeling to even understand what all of these costs are going to materialize to over the next 20 years," he said, but the service is "working hard to converge on a model" to sustain the ships over the long haul.[73]

Legislative Activity for FY2021

CRS Reports Tracking Legislation on Specific Navy Shipbuilding Programs

Detailed coverage of legislative activity on certain Navy shipbuilding programs (including funding levels, legislative provisions, and report language) can be found in the following CRS reports:

- CRS Report R41129, *Navy Columbia (SSBN-826) Class Ballistic Missile Submarine Program: Background and Issues for Congress*, by Ronald O'Rourke.
- CRS Report RL32418, *Navy Virginia (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress*, by Ronald O'Rourke.
- CRS Report RS20643, *Navy Ford (CVN-78) Class Aircraft Carrier Program: Background and Issues for Congress*, by Ronald O'Rourke. (This report also covers the issue of the Administration's FY2020 budget proposal, which the Administration withdrew on April 30, to not fund a mid-life refueling overhaul [called a refueling complex overhaul, or RCOH] for the aircraft carrier *Harry S. Truman* [CVN-75], and to retire CVN-75 around FY2024.)
- CRS Report RL32109, *Navy DDG-51 and DDG-1000 Destroyer Programs: Background and Issues for Congress*, by Ronald O'Rourke.

[72] U.S. Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, pp. 19-20.

[73] Paul McLeary, "Navy Wary of Growing Costs While It Ramps Up Ops," *Breaking Defense*, May 15, 2019.

- CRS Report R44972, *Navy Frigate (FFG[X]) Program: Background and Issues for Congress*, by Ronald O'Rourke.
- CRS Report R43543, *Navy LPD-17 Flight II and LHA Amphibious Ship Programs: Background and Issues for Congress*, by Ronald O'Rourke.
- CRS Report R43546, *Navy John Lewis (TAO-205) Class Oiler Shipbuilding Program: Background and Issues for Congress*, by Ronald O'Rourke.
- CRS Report R45757, *Navy Large Unmanned Surface and Undersea Vehicles: Background and Issues for Congress*, by Ronald O'Rourke.

Legislative activity on individual Navy shipbuilding programs that are not covered in detail in the above reports is covered below.

Summary of Congressional Action on FY2021 Funding Request

The Navy's proposed FY2021 budget requests funding for the procurement of 7 new ships:

- 1 Columbia-class ballistic missile submarine;
- 1 Virginia-class attack submarine;
- 2 DDG-51 class Aegis destroyers;
- 1 FFG(X) frigate;
- 2 TATS towing, salvage, and rescue ships.

As discussed earlier, the Navy's FY2021 budget submission presents LPD-31, an LPD-17 Flight II amphibious ship, as a ship requested for procurement in FY2021. Consistent with congressional action on the Navy's FY2020 budget regarding the procurement of LPD-31, this CRS report treats LPD-31 as a ship that Congress procured (i.e., authorized and provided procurement funding for) in FY2020.

The Navy's proposed FY2021 shipbuilding budget also requests funding for ships that have been procured in prior fiscal years, and ships that are to be procured in future fiscal years, as well as funding for activities other than the building of new Navy ships.

Table 6 summarizes congressional action on the Navy's FY2021 funding request for Navy shipbuilding. The table shows the amounts requested and congressional changes to those requested amounts. A blank cell in a filled-in column showing congressional changes to requested amounts indicates no change from the requested amount.

Table 6. Summary of Congressional Action on FY2021 Funding Request

Millions of dollars, rounded to nearest tenth; totals may not add due to rounding

			Congressional changes to requested amounts					
			Authorization			Appropriation		
Line number	Program	Request	HASC	SASC	Conf.	HAC	SAC	Conf.
Shipbuilding and Conversion, Navy (SCN) appropriation account								
001	Columbia-class SSBN	2,891.5						
002	Columbia-class SSBN (AP)	1,123.2						
003	CVN 78-80 aircraft carriers	997.5						
004	CVN-81 aircraft carrier	1,645.6						
005	Virginia-class SSN	2,334.7						
006	Virginia-class SSN (AP)	1,901.2						
007	CVN RCOH	1,878.5						
008	CVN RCOH (AP)	17.4						
009	DDG-1000	78.2						
010	DDG-51	3,040.3						
011	DDG-51 (AP)	29.3						
012	LCS	0						
013	FFG(X)	1,053.1						
014	LPD-17 Flight II	1,155.8						
015	LPD-17 Flight II (AP)	0						
016	Expeditionary Sea Base (ESB)	0						
017	LHA amphibious assault ship	0						
018	LHA amphibious assault ship (AP)	0						
019	Expeditionary Fast Transport (EPF)	0						
020	TAO-205 oiler	0						
021	TAO-205 oiler (AP)	0						
022	TATS	168.2						
023	LCU 1700 landing craft	87.4						
024	Outfitting and post delivery	825.6						
025	Ship-to-shore connector (SSC)	0						
026	Service craft	249.8						
027	LCAC landing craft SLEP	56.5						
028	Completion of PY ships	369.1						
TOTAL		**19,902.8**						

Source: Table prepared by CRS based on Navy FY2021 budget submission, committee reports, and explanatory statements on the FY2021 National Defense Authorization Act and FY2020 DOD Appropriations Act.

Notes: Millions of dollars, rounded to nearest tenth. A blank cell indicates no change to requested amount. Totals may not add due to rounding. **AP** is advance procurement funding; **HASC** is House Armed Services Committee; **SASC** is Senate Armed Services Committee; **HAC** is House Appropriations Committee; **SAC** is Senate Appropriations Committee; **Conf.** is conference report.

SHIPS Implementation Act (S. 3258)

On February 5, 2020, Senator Wicker introduced the Securing the Homeland by Increasing our Power on the Seas (SHIPS) Implementation Act. The text of the bill states:

A BILL

To foster the implementation of the policy of the United States to achieve 355 battle force ships as soon as practicable.

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

SECTION 1. Short title.

This Act may be cited as the "Securing the Homeland by Increasing our Power on the Seas Implementation Act" or "SHIPS Implementation Act".

SEC. 2. Findings.

Congress makes the following findings:

(1) The 2016 Navy Force Structure Assessment (FSA) started with a request to the combatant commanders to provide their unconstrained desire for Navy forces in their respective theaters consistent with meeting the demands of the Defense Planning Scenarios. To fully resource these platform-specific demands with very little risk in any theater while supporting enduring missions, ongoing two operations and setting the theater for prompt warfighting response, the Navy would require a 653-ship force.

(2) The 2016 Navy FSA further determined that a 355-ship battle force is the level that balances an acceptable level of warfighting risk to Navy equipment and personnel against available resources and achieves a force size that can reasonably achieve success.

(3) On March 27, 2019, before the Committee on Armed Services of the Senate, Vice Admiral William Merz testified, "I certainly do not expect the [355-ship requirement] to go any lower. I would not be surprised if it goes up in several categories.".

(4) The Navy battle force currently consists of 293 ships.

(5) The Navy projects having 313 battle force ships in 2025.

(6) The Navy assesses the size of the People's Liberation Army Navy as having surpassed that of the United States Navy and predicts that it will reach 400 ships in 2025.

(7) Section 1025 of the National Defense Authorization Act for Fiscal Year 2018 (Public Law 115–91; 10 U.S.C. 7921 note) established the policy of the United States to have available, as soon as practicable, not fewer than 355 battle force ships, with funding subject to the availability of appropriations or other funds.

(8) The Department of Defense has been able to achieve program efficiencies and cost savings by using multiyear and block buy contracting with many weapons programs. These contracting strategies are currently being utilized to procure Ford-class aircraft carriers, Arleigh Burke-class destroyers, Virginia-class submarines, and John Lewis-class fleet oilers.

SEC. 3. Sense of Congress on implementation of the Securing the Homeland by Increasing our Power on the Seas Implementation Act.

It is the sense of Congress that to achieve the national policy of the United States to have available, as soon as practicable, not fewer than 355 battle force ships—

(1) the Navy must be adequately resourced to increase the size of the Navy in accordance with the national policy, which includes the associated ships, aircraft, personnel, sustainment, and munitions;

(2) across fiscal years 2021 through 2025, the Navy should start construction on not fewer than—

(A) 12 Arleigh Burke-class destroyers;

(B) 10 Virginia-class submarines;

(C) 2 Columbia-class submarines;

(D) 3 San Antonio-class amphibious ships;

(E) 1 LHA-class amphibious ship;

(F) 6 John Lewis-class fleet oilers; and

(G) 5 guided missile frigates;

(3) new guided missile frigate construction should increase to a rate of between two and four ships per year once design maturity and construction readiness permit;

(4) the Columbia-class submarine program should be funded using the National Sea Based Deterrence Fund with funds that are in addition to the Navy budget in recognition of the critical single national mission that these vessels will perform;

(5) stable shipbuilding rates of construction should be maintained for each vessel class, utilizing multi-year or block buy contract authorities when appropriate, until a deliberate transition plan is identified; and

(6) prototyping of potential new shipboard subsystems should be accelerated to build knowledge systematically, and, to the maximum extent practicable, shipbuilding prototyping should occur at the subsystem-level in advance of ship design.

SEC. 4. Procurement authorities for certain shipbuilding programs.

(a) Contract authority.—

(1) PROCUREMENT AUTHORIZED.—In fiscal year 2021, the Secretary of the Navy may enter into one or more contracts for the procurement of any or all of the following groups of vessels:

(A) Three San Antonio-class amphibious ships and one America-class amphibious ship.

(B) Two Columbia-class submarines.

(C) Six John Lewis-class fleet oilers.

(2) PROCUREMENT IN CONJUNCTION WITH EXISTING CONTRACTS.—The ships authorized to be procured under paragraph (1) may be procured as additions to existing contracts covering such programs.

(b) Certification required.—A contract may not be entered into under subsection (a) unless the Secretary of the Navy certifies to the congressional defense committees, in writing, not later than 30 days before entry into the contract, each of the following, which shall be prepared by the milestone decision authority for such programs:

(1) The use of such a contract will result in significant savings compared to the total anticipated costs of carrying out the program through annual contracts. In certifying cost savings under the preceding sentence, the Secretary shall include a written explanation of—

(A) the estimated end cost and appropriated funds by fiscal year, by hull, without the authority provided in subsection (a);

(B) the estimated end cost and appropriated funds by fiscal year, by hull, with the authority provided in subsection (a);

(C) the estimated cost savings or increase by fiscal year, by hull, with the authority provided in subsection (a);

(D) the discrete actions that will accomplish such cost savings or avoidance; and

(E) the contractual actions that will ensure the estimated cost savings are realized.

(2) There is a reasonable expectation that throughout the contemplated contract period the Secretary of the Navy will request funding for the contract at the level required to avoid contract cancellation.

(3) There is a stable design for the property to be acquired and the technical risks associated with such property are not excessive.

(4) The estimates of both the cost of the contract and the anticipated cost avoidance through the use of a contract authorized under subsection (a) are realistic.

(5) The use of such a contract will promote the national security of the United States.

(6) During the fiscal year in which such contract is to be awarded, sufficient funds will be available to perform the contract in such fiscal year, and the future-years defense program (as defined under section 221 of title 10, United States Code) for such fiscal year will include the funding required to execute the program without cancellation.

(c) Use of incremental funding.—With respect to a contract or contracts entered into pursuant to subsection (a)(1)(B), the Secretary of the Navy may use incremental funding to make payments under the contract with funds appropriated to the Shipbuilding and Conversion, Navy or National Sea Based Deterrence Fund accounts through fiscal year 2025.

(d) Authority for advance procurement.—The Secretary of the Navy may enter into one or more contracts for advance procurement associated with a vessel or vessels for which authorization to enter into a multiyear procurement contract is provided under subsection (a), and for systems and subsystems associated with such vessels in economic order quantities when cost savings are achievable.

(e) Condition for out-Year contract payments.—A contract entered into under subsection (a) shall provide that any obligation of the United States to make a payment under the contract for a fiscal year is subject to the availability of appropriations for that purpose for such fiscal year.

(f) Definitions.—In this section:

(1) CONGRESSIONAL DEFENSE COMMITTEES.—The term “congressional defense committees” has the meaning given the term in section 101(a)(16) of title 10, United States Code.

(2) MILESTONE DECISION AUTHORITY.—The term “milestone decision authority” has the meaning given the term in section 2366a(d) of title 10, United States Code.

Appendix A. Strategic and Budgetary Context

This appendix presents some brief comments on elements of the strategic and budgetary context in which U.S. Navy force structure and shipbuilding plans may be considered.

Shift in International Security Environment

World events in recent years have led observers, particularly since late 2013, to conclude that the international security environment in recent years has undergone a shift from the post-Cold War era that began in the late 1980s and early 1990s, also sometimes known as the unipolar moment (with the United States as the unipolar power), to a new and different situation that features, among other things, renewed great power competition with China and Russia and challenges by these two countries and others to elements of the U.S.-led international order that has operated since World War II. This situation, which has multiple potential implications for U.S. defense plans and programs, is discussed further in another CRS report.[74]

World Geography, U.S. Grand Strategy, and U.S. Naval Forces[75]

From a U.S. perspective on grand strategy and geopolitics,[76] it can be noted that most of the world's people, resources, and economic activity are located not in the Western Hemisphere, but in the other hemisphere, particularly Eurasia. In response to this basic feature of world geography, U.S. policymakers for the past several decades have chosen to pursue, as a key element of U.S. national strategy, a goal of preventing the emergence of a regional hegemon in one part of Eurasia or another, on the grounds that such a hegemon could represent a concentration of power strong enough to threaten vital U.S. interests by, for example, denying the United States access to some of the other hemisphere's resources and economic activity. Although U.S. policymakers have not often stated this key national strategic goal explicitly in public, U.S. military (and diplomatic) operations in recent decades—both wartime operations and day-to-day operations—can be viewed as having been carried out in no small part in support of this key goal.

The traditional U.S. goal of preventing the emergence of a regional hegemon in one part of Eurasia or another has been a major reason why the U.S. military is structured with force elements that enable it to cross broad expanses of ocean and air space and then conduct sustained,

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[74] CRS Report R43838, *Renewed Great Power Competition: Implications for Defense—Issues for Congress*, by Ronald O'Rourke.

[75] For a stand-alone CRS product covering much of the same material presented in this section, see CRS In Focus IF10485, *Defense Primer: Geography, Strategy, and U.S. Force Design*, by Ronald O'Rourke.

[76] The term *grand strategy* generally refers in foreign policy discussions to a country's overall approach for securing its interests and making its way in the world, using all the national instruments at its disposal, including diplomatic, informational, military, and economic tools (sometimes abbreviated in U.S. government parlance as DIME). A country's role in the world can be viewed as a visible expression of its grand strategy. For the United States, grand strategy can be viewed as a design or blueprint at a global or interregional level, as opposed to U.S. approaches for individual regions, countries, or issues.

The term *geopolitics* is often used as a synonym for international politics or for strategy relating to international politics. More specifically, it refers to the influence of basic geographic features on international relations, and to the analysis of international relations from a perspective that places a strong emphasis on the influence of such geographic features. Basic geographic features involved in geopolitical analysis include things such as the relative sizes and locations of countries or land masses; the locations of key resources such as oil or water; geographic barriers such as oceans, deserts, and mountain ranges; and key transportation links such as roads, railways, and waterways.

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

large-scale military operations upon arrival. Force elements associated with this goal include, among other things, an Air Force with significant numbers of long-range bombers, long-range surveillance aircraft, long-range airlift aircraft, and aerial refueling tankers, and a Navy with significant numbers of aircraft carriers, nuclear-powered attack submarines, large surface combatants, large amphibious ships, and underway replenishment ships.

The United States is the only country in the world that has designed its military to cross broad expanses of ocean and air space and then conduct sustained, large-scale military operations upon arrival. The other countries in the Western Hemisphere do not design their forces to do this because they cannot afford to, and because the United States has been, in effect, doing it for them. Countries in the other hemisphere do not design their forces to do this for the very basic reason that they are already in the other hemisphere, and consequently instead spend their defense money on forces that are tailored largely for influencing events in their own local region.

The fact that the United States has designed its military to do something that other countries do not design their forces to do—cross broad expanses of ocean and air space and then conduct sustained, large-scale military operations upon arrival—can be important to keep in mind when comparing the U.S. military to the militaries of other nations. For example, in observing that the U.S. Navy has 11 aircraft carriers while other countries have no more than one or two, it can be noted other countries do not need a significant number of aircraft carriers because, unlike the United States, they are not designing their forces to cross broad expanses of ocean and air space and then conduct sustained, large-scale military operations upon arrival.

As another example, it is sometimes noted, in assessing the adequacy of U.S. naval forces, that U.S. naval forces are equal in tonnage to the next dozen or more navies combined, and that most of those next dozen or more navies are the navies of U.S. allies. Those other fleets, however, are mostly of Eurasian countries, which do not design their forces to cross to the other side of the world and then conduct sustained, large-scale military operations upon arrival. The fact that the U.S. Navy is much bigger than allied navies does not necessarily prove that U.S. naval forces are either sufficient or excessive; it simply reflects the differing and generally more limited needs that U.S. allies have for naval forces. (It might also reflect an underinvestment by some of those allies to meet even their more limited naval needs.)

Countries have differing needs for naval and other military forces. The United States, as a country located in the Western Hemisphere that has adopted a goal of preventing the emergence of a regional hegemon in one part of Eurasia or another, has defined a need for naval and other military forces that is quite different from the needs of allies that are located in Eurasia. The sufficiency of U.S. naval and other military forces consequently is best assessed not through comparison to the militaries of other countries, but against U.S. strategic goals.

More generally, from a geopolitical perspective, it can be noted that that U.S. naval forces, while not inexpensive, give the United States the ability to convert the world's oceans—a global commons that covers more than two-thirds of the planet's surface—into a medium of maneuver and operations for projecting U.S. power ashore and otherwise defending U.S. interests around the world. The ability to use the world's oceans in this manner—and to deny other countries the use of the world's oceans for taking actions against U.S. interests—constitutes an immense asymmetric advantage for the United States. This point would be less important if less of the world were covered by water, or if the oceans were carved into territorial blocks, like the land. Most of the world, however, is covered by water, and most of those waters are international waters, where naval forces can operate freely. The point, consequently, is not that U.S. naval forces are intrinsically special or privileged—it is that they have a certain value simply as a consequence of the physical and legal organization of the planet.

Potential Change in U.S. Role in the World

The U.S. role in the world refers to the overall character, purpose, or direction of U.S. participation in international affairs and the country's overall relationship to the rest of the world. The U.S. role in the world can be viewed as establishing the overall context or framework for U.S. policymakers for developing, implementing, and measuring the success of U.S. policies and actions on specific international issues, and for foreign countries or other observers for interpreting and understanding U.S. actions on the world stage.

While descriptions of the U.S. role in the world since the end of World War II vary in their specifics, it can be described in general terms as consisting of four key elements: global leadership; defense and promotion of the liberal international order; defense and promotion of freedom, democracy, and human rights; and prevention of the emergence of regional hegemons in Eurasia.

A change in the U.S. role could have significant and even profound effects on U.S. security, freedom, and prosperity. It could lead to a change in U.S. grand strategy (see previous section), which in turn could lead to significant changes to U.S. defense plans and programs, including plans and programs relating to the Navy.

Some observers, particularly critics of the Trump Administration, argue that under the Trump Administration, the United States is substantially changing the U.S. role in the world. Other observers, particularly supporters of the Trump Administration, while acknowledging that the Trump Administration has changed U.S. foreign policy in a number of areas compared to policies pursued by the Obama Administration, argue that under the Trump Administration, there has been less change and more continuity regarding the U.S. role in the world. The situation is discussed further in another CRS report.[77]

Declining U.S. Technological and Qualitative Edge

DOD officials have expressed concern that the technological and qualitative edge that U.S. military forces have had relative to the military forces of other countries is being narrowed by improving military capabilities in other countries. China's improving military capabilities are a primary contributor to that concern.[78] Russia's rejuvenated military capabilities are an additional contributor. DOD in recent years has taken a number of actions to arrest and reverse the decline in the U.S. technological and qualitative edge.[79]

China's Naval Modernization Effort

Observers of Chinese and U.S. military forces view China's improving naval capabilities as posing a potential challenge in the Western Pacific to the U.S. Navy's ability to achieve and maintain control of blue-water ocean areas in wartime—the first such challenge the U.S. Navy has faced since the end of the Cold War.[80] More broadly, these observers view China's naval

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

[78] For more on China's naval modernization effort, see CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke.

[79] For additional discussion, see CRS Report R43838, *Renewed Great Power Competition: Implications for Defense—Issues for Congress*, by Ronald O'Rourke.

[80] The term "blue-water ocean areas" is used here to mean waters that are away from shore, as opposed to near-shore

capabilities as a key element of an emerging broader Chinese military challenge to the long-standing status of the United States as the leading military power in the Western Pacific.

Constraints on Defense Spending

Constraints on defense spending, combined with some of the considerations above, have led to discussions among observers about how to balance competing demands for finite U.S. defense funds, and about whether programs for responding to China's military modernization effort can be adequately funded while also adequately funding other defense-spending priorities, such as initiatives for responding to Russia's actions in Ukraine and elsewhere in Europe and U.S. operations for countering challenges to U.S. interests in the Middle East.

(i.e., littoral) waters. Iran is viewed as posing a challenge to the U.S. Navy's ability to quickly achieve and maintain sea control in littoral waters in and near the Strait of Hormuz.

Appendix B. Earlier Navy Force-Structure Goals Dating Back to 2001

The table below shows earlier Navy force-structure goals dating back to 2001. The 308-ship force-level goal of March 2015, shown in the first column of the table, is the goal that was replaced by the 355-ship force-level goal released in December 2016.

Table B-1. Earlier Navy Force-Structure Goals Dating Back to 2001

Ship type	308-ship goal of March 2015	306-ship goal of January 2013	~310-316 ship goal of March 2012	Revised 313-ship goal of September 2011	Changes to February 2006 313-ship goal announced through mid-2011	February 2006 Navy goal for 313-ship fleet	Early-2005 Navy goal for fleet of 260-325 ships		2002-2004 Navy goal for 375-ship Navy[a]	2001 QDR goal for 310-ship Navy
							260-ships	325-ships		
Ballistic missile submarines (SSBNs)	12[b]	12[b]	12-14[b]	12[b]	12[b]	14	14	14	14	14
Cruise missile submarines (SSGNs)	0[c]	0[c]	0-4[c]	4[c]	0[c]	4	4	4	4	2 or 4[d]
Attack submarines (SSNs)	48	48	~48	48	48	48	37	41	55	55
Aircraft carriers	11[e]	11[e]	11[e]	11[e]	11[e]	11[f]	10	11	12	12
Cruisers and destroyers	88	88	~90	94	94[g]	88	67	92	104	116
Frigates	0	0	0	0	0	0	0	0	0	
Littoral Combat Ships (LCSs)	52	52	~55	55	55	55	63	82	56	0
Amphibious ships	34	33	~32	33	33[h]	31	17	24	37	36
MPF(F) ships[i]	0[i]	0[i]	0[i]	0[i]	0[i]	12[i]	14[i]	20[i]	0[i]	0[i]
Combat logistics (resupply) ships	29	29	~29	30	30	30	24	26	42	34
Dedicated mine warfare ships	0	0	0	0	0	0	0	0	26[k]	16
Joint High Speed Vessels (JHSVs)	10[l]	10[l]	10[l]	10[l]	21[l]	3	0	0	0	0
Other[m]	24	23	~23	16	24[n]	17	10	11	25	25
Total battle force ships	**308**	**306**	**~310-316**	**313**	**328**	**313**	**260**	**325**	**375**	**310 or 312**

Sources: Table prepared by CRS based on U.S. Navy data.

Notes: QDR is Quadrennial Defense Review. The "~" symbol means approximately.

a. Initial composition. Composition was subsequently modified.

b. The Navy plans to replace the 14 current Ohio-class SSBNs with a new class of 12 next-generation SSBNs. For further discussion, see CRS Report R41129, *Navy Columbia (SSBN-826) Class Ballistic Missile Submarine Program: Background and Issues for Congress*, by Ronald O'Rourke.

c. Although the Navy plans to continue operating its four SSGNs until they reach retirement age in the late 2020s, the Navy does not plan to replace these ships when they retire. This situation can be expressed in a table like this one with either a 4 or a 0.

d. The report on the 2001 QDR did not mention a specific figure for SSGNs. The Administration's proposed FY2001 DOD budget requested funding to support the conversion of two available Trident SSBNs into SSGNs, and the retirement of two other Trident SSBNs. Congress, in marking up this request, supported a plan to convert all four available SSBNs into SSGNs.

e. With congressional approval, the goal has been temporarily be reduced to 10 carriers for the period between the retirement of the carrier *Enterprise* (CVN-65) in December 2012 and entry into service of the carrier *Gerald R. Ford* (CVN-78), currently scheduled for September 2015.

f. For a time, the Navy characterized the goal as 11 carriers in the nearer term, and eventually 12 carriers.

g. The 94-ship goal was announced by the Navy in an April 2011 report to Congress on naval force structure and missile defense.

h. The Navy acknowledged that meeting a requirement for being able to lift the assault echelons of 2.0 Marine Expeditionary Brigades (MEBs) would require a minimum of 33 amphibious ships rather than the 31 ships shown in the February 2006 plan. For further discussion, see CRS Report RL34476, *Navy LPD-17 Amphibious Ship Procurement: Background, Issues, and Options for Congress*, by Ronald O'Rourke.

i. Today's Maritime Prepositioning Force (MPF) ships are intended primarily to support Marine Corps operations ashore, rather than Navy combat operations, and thus are not counted as Navy battle force ships. The planned MPF (Future) ships, however, would have contributed to Navy combat capabilities (for example, by supporting Navy aircraft operations). For this reason, the ships in the planned MPF(F) squadron were counted by the Navy as battle force ships. The planned MPF(F) squadron was subsequently restructured into a different set of initiatives for enhancing the existing MPF squadrons; the Navy no longer plans to acquire an MPF(F) squadron.

j. The Navy no longer plans to acquire an MPF(F) squadron. The Navy, however, has procured or plans to procure some of the ships that were previously planned for the squadron—specifically, TAKE-1 class cargo ships, and Mobile Landing Platform (MLP)/Afloat Forward Staging Base (AFSB) ships. These ships are included in the total shown for "Other" ships. AFSBs are now called Expeditionary Sea Base ships (ESBs).

k. The figure of 26 dedicated mine warfare ships included 10 ships maintained in a reduced mobilization status called Mobilization Category B. Ships in this status are not readily deployable and thus do not count as battle force ships. The 375-ship proposal thus implied transferring these 10 ships to a higher readiness status.

l. Totals shown include 5 ships transferred from the Army to the Navy and operated by the Navy primarily for the performance of Army missions.

m. This category includes, among other things, command ships and support ships.

n. The increase in this category from 17 ships under the February 2006 313-ship goal to 24 ships under the apparent 328-ship goal included the addition of one TAGOS ocean surveillance ship and the transfer into this category of six ships—three modified TAKE-1 class cargo ships, and three Mobile Landing Platform (MLP) ships—that were previously intended for the planned (but now canceled) MPF(F) squadron.

Appendix C. Comparing Past Ship Force Levels to Current or Potential Future Levels

In assessing the appropriateness of the current or potential future number of ships in the Navy, observers sometimes compare that number to historical figures for total Navy fleet size. Historical figures for total fleet size, however, can be a problematic yardstick for assessing the appropriateness of the current or potential future number of ships in the Navy, particularly if the historical figures are more than a few years old, because

- the missions to be performed by the Navy, the mix of ships that make up the Navy, and the technologies that are available to Navy ships for performing missions all change over time; and
- the number of ships in the fleet in an earlier year might itself have been inappropriate (i.e., not enough or more than enough) for meeting the Navy's mission requirements in that year.

Regarding the first bullet point above, the Navy, for example, reached a late-Cold War peak of 568 battle force ships at the end of FY1987,[81] and as of March 13, 2020, included a total of 296 battle force ships. The FY1987 fleet, however, was intended to meet a set of mission requirements that focused on countering Soviet naval forces at sea during a potential multitheater NATO-Warsaw Pact conflict, while the March 2020 fleet is intended to meet a considerably different set of mission requirements centered on countering China's improving naval capabilities. In addition, the Navy of FY1987 differed substantially from the March 2020 fleet in areas such as profusion of precision-guided air-delivered weapons, numbers of Tomahawk-capable ships, and the sophistication of C4ISR systems and networking capabilities.[82]

In coming years, Navy missions may shift again, and the capabilities of Navy ships will likely have changed further by that time due to developments such as more comprehensive implementation of networking technology, increased use of ship-based unmanned vehicles, and the potential fielding of new types of weapons such as lasers or electromagnetic rail guns.

The 568-ship fleet of FY1987 may or may not have been capable of performing its stated missions; the 296-ship fleet of March 2020 may or may not be capable of performing its stated missions; and a fleet years from now with a certain number of ships may or may not be capable of performing its stated missions. Given changes over time in mission requirements, ship mixes, and technologies, however, these three issues are to a substantial degree independent of one another.

For similar reasons, trends over time in the total number of ships in the Navy are not necessarily a reliable indicator of the direction of change in the fleet's ability to perform its stated missions. An increasing number of ships in the fleet might not necessarily mean that the fleet's ability to

[81] Some publications have stated that the Navy reached a peak of 594 ships at the end of FY1987. This figure, however, is the total number of active ships in the fleet, which is not the same as the total number of battle force ships. The battle force ships figure is the number used in government discussions of the size of the Navy. In recent years, the total number of active ships has been larger than the total number of battle force ships. For example, the Naval History and Heritage Command (formerly the Naval Historical Center) states that as of November 16, 2001, the Navy included a total of 337 active ships, while the Navy states that as of November 19, 2001, the Navy included a total of 317 battle force ships. Comparing the total number of active ships in one year to the total number of battle force ships in another year is thus an apples-to-oranges comparison that in this case overstates the decline since FY1987 in the number of ships in the Navy. As a general rule to avoid potential statistical distortions, comparisons of the number of ships in the Navy over time should use, whenever possible, a single counting method.

[82] C4ISR stands for command and control, communications, computers, intelligence, surveillance, and reconnaissance.

perform its stated missions is increasing, because the fleet's mission requirements might be increasing more rapidly than ship numbers and average ship capability. Similarly, a decreasing number of ships in the fleet might not necessarily mean that the fleet's ability to perform stated missions is decreasing, because the fleet's mission requirements might be declining more rapidly than numbers of ships, or because average ship capability and the percentage of time that ships are in deployed locations might be increasing quickly enough to more than offset reductions in total ship numbers.

Regarding the second of the two bullet points above, it can be noted that comparisons of the size of the fleet today with the size of the fleet in earlier years rarely appear to consider whether the fleet was appropriately sized in those earlier years (and therefore potentially suitable as a yardstick of comparison), even though it is quite possible that the fleet in those earlier years might not have been appropriately sized, and even though there might have been differences of opinion among observers at that time regarding that question. Just as it might not be prudent for observers years from now to tacitly assume that the 290-ship Navy of September 2019 was appropriately sized for meeting the mission requirements of 2019, even though there were differences of opinion among observers on that question, simply because a figure of 290 ships appears in the historical records for 2019, so, too, might it not be prudent for observers today to tacitly assume that the number of ships of the Navy in an earlier year was appropriate for meeting the Navy's mission requirements that year, even though there might have been differences of opinion among observers at that time regarding that question, simply because the size of the Navy in that year appears in a table like **Table H-1**.

Previous Navy force structure plans, such as those shown in **Table B-1**, might provide some insight into the potential adequacy of a proposed new force-structure plan, but changes over time in mission requirements, technologies available to ships for performing missions, and other force-planning factors, as well as the possibility that earlier force-structure plans might not have been appropriate for meeting the mission demands of their times, suggest that some caution should be applied in using past force structure plans for this purpose, particularly if those past force structure plans are more than a few years old. The Reagan-era goal for a 600-ship Navy, for example, was designed for a Cold War set of missions focusing on countering Soviet naval forces at sea, which is not an appropriate basis for planning the Navy today, and there was considerable debate during those years as to the appropriateness of the 600-ship goal.[83]

[83] Navy force structure plans that predate those shown in **Table B-1** include the Reagan-era 600-ship goal of the 1980s, the Base Force fleet of more than 400 ships planned during the final two years of the George H. W. Bush Administration, the 346-ship fleet from the Clinton Administration's 1993 Bottom-Up Review (or BUR, sometimes also called Base Force II), and the 310-ship fleet of the Clinton Administration's 1997 QDR. The table below summarizes some key features of these plans.

Features of Recent Navy Force Structure Plans

Plan	600-ship	Base Force	1993 BUR	1997 QDR
Total ships	~600	~450/416[a]	346	~305/310[b]
Attack submarines	100	80/~55[c]	45-55	50/55[d]
Aircraft carriers	15[e]	12	11+1[f]	11+1[f]
Surface combatants	242/228[g]	~150	~124	116
Amphibious ships	~75[h]	51[i]	41[i]	36[i]

Source: Prepared by CRS based on DOD and U.S. Navy data.

a. Commonly referred to as 450-ship goal, but called for decreasing to 416 ships by end of FY1999.

b. Original total of about 305 ships was increased to about 310 due to increase in number of attack submarines to 55

from 50.
c. Plan originally included 80 attack submarines, but this was later reduced to about 55.
d. Plan originally included 50 attack submarines but this was later increased to 55.
e. Plus one additional aircraft carrier in the service life extension program (SLEP).
f. Eleven active carriers plus one operational reserve carrier.
g. Plan originally included 242 surface combatants but this was later reduced to 228.
h. Number needed to lift assault echelons of one Marine Expeditionary Force (MEF) plus one Marine Expeditionary Brigade (MEB).
i. Number needed to lift assault echelons of 2.5 MEBs. Changing numbers needed to meet this goal reflect in part changes in the design and capabilities of amphibious ships.

Appendix D. Industrial Base and Employment Aspects of Additional Shipbuilding Work

This appendix presents background information on the ability of the industrial base to take on the additional shipbuilding work associated with achieving and maintaining the Navy's 355-ship force-level goal and on the employment impact of additional shipbuilding work.

Industrial Base Ability

The U.S. shipbuilding industrial base has some unused capacity to take on increased Navy shipbuilding work, particularly for certain kinds of surface ships, and its capacity could be increased further over time to support higher Navy shipbuilding rates. Navy shipbuilding rates could not be increased steeply across the board overnight—time (and investment) would be needed to hire and train additional workers and increase production facilities at shipyards and supplier firms, particularly for supporting higher rates of submarine production. Depending on their specialties, newly hired workers could be initially less productive per unit of time worked than more experienced workers.

Some parts of the shipbuilding industrial base, such as the submarine construction industrial base, could face more challenges than others in ramping up to the higher production rates required to build the various parts of the 355-ship fleet. Over a period of a few to several years, with investment and management attention, Navy shipbuilding could ramp up to higher rates for achieving a 355-ship fleet over a period of 20-30 years.

An April 2017 CBO report stated that

> all seven shipyards [currently involved in building the Navy's major ships] would need to increase their workforces and several would need to make improvements to their infrastructure in order to build ships at a faster rate. However, certain sectors face greater obstacles in constructing ships at faster rates than others: Building more submarines to meet the goals of the 2016 force structure assessment would pose the greatest challenge to the shipbuilding industry. Increasing the number of aircraft carriers and surface combatants would pose a small to moderate challenge to builders of those vessels. Finally, building more amphibious ships and combat logistics and support ships would be the least problematic for the shipyards. The workforces across those yards would need to increase by about 40 percent over the next 5 to 10 years. Managing the growth and training of those new workforces while maintaining the current standard of quality and efficiency would represent the most significant industrywide challenge. In addition, industry and Navy sources indicate that as much as $4 billion would need to be invested in the physical infrastructure of the shipyards to achieve the higher production rates required under the [notional] 15-year and 20-year [buildup scenarios examined by CBO]. Less investment would be needed for the [notional] 25-year or 30-year [buildup scenarios examined by CBO].[84]

A January 13, 2017, press report states the following:

> The Navy's production lines are hot and the work to prepare them for the possibility of building out a much larger fleet would be manageable, the service's head of acquisition said Thursday.
>
> From a logistics perspective, building the fleet from its current 274 ships to 355, as recommended in the Navy's newest force structure assessment in December, would be

[84] Congressional Budget Office, *Costs of Building a 355-Ship Navy*, April 2017, pp. 9-10.

> straightforward, Assistant Secretary of the Navy for Research, Development and Acquisition Sean Stackley told reporters at the Surface Navy Association's annual symposium.
>
> "By virtue of maintaining these hot production lines, frankly, over the last eight years, our facilities are in pretty good shape," Stackley said. "In fact, if you talked to industry, they would say we're underutilizing the facilities that we have."
>
> The areas where the Navy would likely have to adjust "tooling" to answer demand for a larger fleet would likely be in Virginia-class attack submarines and large surface combatants, the DDG-51 guided missile destroyers—two ship classes likely to surge if the Navy gets funding to build to 355 ships, he said.
>
> "Industry's going to have to go out and procure special tooling associated with going from current production rates to a higher rate, but I would say that's easily done," he said.
>
> Another key, Stackley said, is maintaining skilled workers—both the builders in the yards and the critical supply-chain vendors who provide major equipment needed for ship construction. And, he suggested, it would help to avoid budget cuts and other events that would force workforce layoffs.
>
> "We're already prepared to ramp up," he said. "In certain cases, that means not laying off the skilled workforce we want to retain."[85]

A January 17, 2017, press report states the following:

> Building stable designs with active production lines is central to the Navy's plan to grow to 355 ships. "if you look at the 355-ship number, and you study the ship classes (desired), the big surge is in attack submarines and large surface combatants, which today are DDG-51 (destroyers)," the Assistant Secretary of the Navy, Sean Stackley, told reporters at last week's Surface Navy Association conference. Those programs have proven themselves reliable performers both at sea and in the shipyards.
>
> From today's fleet of 274 ships, "we're on an irreversible path to 308 by 2021. Those ships are already in construction," said Stackley. "To go from there to 355, virtually all those ships are currently in production, with some exceptions: Ohio Replacement, (we) just got done the Milestone B there (to move from R&D into detailed design); and then upgrades to existing platforms. So we have hot production lines that will take us to that 355-ship Navy."[86]

A January 24, 2017, press report states the following:

> Navy officials say a recently determined plan to increase its fleet size by adding more new submarines, carriers and destroyers is "executable" and that early conceptual work toward this end is already underway....
>
> Although various benchmarks will need to be reached in order for this new plan to come to fruition, such as Congressional budget allocations, Navy officials do tell Scout Warrior that the service is already working—at least in concept—on plans to vastly enlarge the fleet. Findings from this study are expected to inform an upcoming 2018 Navy Shipbuilding Plan, service officials said.[87]

A January 12, 2017, press report states the following:

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[85] Hope Hodge Seck, "Navy Acquisition Chief: Surge to 355 Ships 'Easily Done,'" *DoD Buzz*, January 13, 2017.

[86] Sydney J. Freedberg Jr., "Build More Ships, But Not New Designs: CNO Richardson To McCain," *Breaking Defense*, January 17, 2017.

[87] Kris Osborn, "Navy: Larger 355-Ship Fleet—'Executable,'" *Scout Warrior*, January 24, 2017.

> Brian Cuccias, president of Ingalls Shipbuilding [a shipyard owned by Huntington Ingalls Industries (HII) that builds Navy destroyers and amphibious ships as well as Coast Guard cutters], said Ingalls, which is currently building 10 ships for four Navy and Coast Guard programs at its 800-acre facility in Pascagoula, Miss., could build more because it is using only 70 to 75 percent of its capacity.[88]

A March 2017 press report states the following:

> As the Navy calls for a larger fleet, shipbuilders are looking toward new contracts and ramping up their yards to full capacity....
>
> The Navy is confident that U.S. shipbuilders will be able to meet an increased demand, said Ray Mabus, then-secretary of the Navy, during a speech at the Surface Navy Association's annual conference in Arlington, Virginia.
>
> They have the capacity to "get there because of the ships we are building today," Mabus said. "I don't think we could have seven years ago."
>
> Shipbuilders around the United States have "hot" production lines and are manufacturing vessels on multi-year or block buy contracts, he added. The yards have made investments in infrastructure and in the training of their workers.
>
> "We now have the basis ... [to] get to that much larger fleet," he said....
>
> Shipbuilders have said they are prepared for more work.
>
> At Ingalls Shipbuilding—a subsidiary of Huntington Ingalls Industries—10 ships are under construction at its Pascagoula, Mississippi, yard, but it is under capacity, said Brian Cuccias, the company's president.
>
> The shipbuilder is currently constructing five guided-missile destroyers, the latest San Antonio-class amphibious transport dock ship, and two national security cutters for the Coast Guard.
>
> "Ingalls is a very successful production line right now, but it has the ability to actually produce a lot more in the future," he said during a briefing with reporters in January.
>
> The company's facility is currently operating at 75 percent capacity, he noted....
>
> Austal USA—the builder of the Independence-variant of the littoral combat ship and the expeditionary fast transport vessel—is also ready to increase its capacity should the Navy require it, said Craig Perciavalle, the company's president.
>
> The latest discussions are "certainly something that a shipbuilder wants to hear," he said. "We do have the capability of increasing throughput if the need and demand were to arise, and then we also have the ability with the present workforce and facility to meet a different mix that could arise as well."
>
> Austal could build fewer expeditionary fast transport vessels and more littoral combat ships, or vice versa, he added.
>
> "The key thing for us is to keep the manufacturing lines hot and really leverage the momentum that we've gained on both of the programs," he said.
>
> The company—which has a 164-acre yard in Mobile, Alabama—is focused on the extension of the LCS and expeditionary fast transport ship program, but Perciavalle noted that it could look into manufacturing other types of vessels.

[88] Marc Selinger, "Navy Needs More Aircraft to Match Ship Increase, Secretary [of the Navy] Says," *Defense Daily*, January 12, 2017. See also Lee Hudson, "Ingalls Operating at About 75 Percent Capacity, Provided Info to Trump Team," *Inside the Navy*, January 16, 2017.

> "We do have excess capacity to even build smaller vessels … if that opportunity were to arise and we're pursuing that," he said.
>
> Bryan Clark, a naval analyst at the Center for Strategic and Budgetary Assessments, a Washington, D.C.-based think tank, said shipbuilders are on average running between 70 and 80 percent capacity. While they may be ready to meet an increased demand for ships, it would take time to ramp up their workforces.
>
> However, the bigger challenge is the supplier industrial base, he said.
>
> "Shipyards may be able to build ships but the supplier base that builds the pumps … and the radars and the radios and all those other things, they don't necessarily have that ability to ramp up," he said. "You would need to put some money into building up their capacity."
>
> That has to happen now, he added.
>
> Rear Adm. William Gallinis, program manager for program executive office ships, said what the Navy must be "mindful of is probably our vendor base that support the shipyards."
>
> Smaller companies that supply power electronics and switchboards could be challenged, he said.
>
> "Do we need to re-sequence some of the funding to provide some of the facility improvements for some of the vendors that may be challenged? My sense is that the industrial base will size to the demand signal. We just need to be mindful of how we transition to that increased demand signal," he said.
>
> The acquisition workforce may also see an increased amount of stress, Gallinis noted. "It takes a fair amount of experience and training to get a good contracting officer to the point to be [able to] manage contracts or procure contracts."
>
> "But I don't see anything that is insurmountable," he added.[89]

At a May 24, 2017, hearing before the Seapower subcommittee of the Senate Armed Services Committee on the industrial-base aspects of the Navy's 355-ship goal, John P. Casey, executive vice president–marine systems, General Dynamics Corporation (one of the country's two principal builders of Navy ships) stated the following:

> It is our belief that the Nation's shipbuilding industrial base can scale-up hot production lines for existing ships and mobilize additional resources to accomplish the significant challenge of achieving the 355-ship Navy as quickly as possible....
>
> Supporting a plan to achieve a 355-ship Navy will be the most challenging for the nuclear submarine enterprise. Much of the shipyard and industrial base capacity was eliminated following the steep drop-off in submarine production that occurred with the cancellation of the Seawolf Program in 1992. The entire submarine industrial base at all levels of the supply chain will likely need to recapitalize some portion of its facilities, workforce, and supply chain just to support the current plan to build the Columbia Class SSBN program, while concurrently building Virginia Class SSNs. Additional SSN procurement will require industry to expand its plans and associated investment beyond the level today....
>
> Shipyard labor resources include the skilled trades needed to fabricate, build and outfit major modules, perform assembly, test and launch of submarines, and associated support organizations that include planning, material procurement, inspection, quality assurance, and ship certification. Since there is no commercial equivalency for Naval nuclear submarine shipbuilding, these trade resources cannot be easily acquired in large numbers from other industries. Rather, these shipyard resources must be acquired and developed over time to ensure the unique knowledge and know-how associated with nuclear

[89] Yasmin Tadjdeh, "Navy Shipbuilders Prepared for Proposed Fleet Buildup," *National Defense*, March 2017.

submarine shipbuilding is passed on to the next generation of shipbuilders. The mechanisms of knowledge transfer require sufficient lead time to create the proficient, skilled craftsmen in each key trade including welding, electrical, machining, shipfitting, pipe welding, painting, and carpentry, which are among the largest trades that would need to grow to support increased demand. These trades will need to be hired in the numbers required to support the increased workload. Both shipyards have scalable processes in place to acquire, train, and develop the skilled workforce they need to build nuclear ships. These processes and associated training facilities need to be expanded to support the increased demand. As with the shipyards, the same limiting factors associated with facilities, workforce, and supply chain also limit the submarine unique first tier suppliers and sub-tiers in the industrial base for which there is no commercial equivalency....

The supply base is the third resource that will need to be expanded to meet the increased demand over the next 20 years. During the OHIO, 688 and SEAWOLF construction programs, there were over 17,000 suppliers supporting submarine construction programs. That resource base was "rationalized" during submarine low rate production over the last 20 years. The current submarine industrial base reflects about 5,000 suppliers, of which about 3,000 are currently active (i.e., orders placed within the last 5 years), 80% of which are single or sole source (based on $). It will take roughly 20 years to build the 12 Columbia Class submarines that starts construction in FY21. The shipyards are expanding strategic sourcing of appropriate non-core products (e.g., decks, tanks, etc.) in order to focus on core work at each shipyard facility (e.g., module outfitting and assembly). Strategic sourcing will move demand into the supply base where capacity may exist or where it can be developed more easily. This approach could offer the potential for cost savings by competition or shifting work to lower cost work centers throughout the country. Each shipyard has a process to assess their current supply base capacity and capability and to determine where it would be most advantageous to perform work in the supply base....

Achieving the increased rate of production and reducing the cost of submarines will require the Shipbuilders to rely on the supply base for more non-core products such as structural fabrication, sheet metal, machining, electrical, and standard parts. The supply base must be made ready to execute work with submarine-specific requirements at a rate and volume that they are not currently prepared to perform. Preparing the supply base to execute increased demand requires early non-recurring funding to support cross-program construction readiness and EOQ funding to procure material in a manner that does not hold up existing ship construction schedules should problems arise in supplier qualification programs. This requires longer lead times (estimates of three years to create a new qualified, critical supplier) than the current funding profile supports....

We need to rely on market principles to allow suppliers, the shipyards and GFE material providers to sort through the complicated demand equation across the multiple ship programs. Supplier development funding previously mentioned would support non-recurring efforts which are needed to place increased orders for material in multiple market spaces. Examples would include valves, build-to-print fabrication work, commodities, specialty material, engineering components, etc. We are engaging our marine industry associations to help foster innovative approaches that could reduce costs and gain efficiency for this increased volume....

Supporting the 355-ship Navy will require Industry to add capability and capacity across the entire Navy Shipbuilding value chain. Industry will need to make investment decisions for additional capital spend starting now in order to meet a step change in demand that would begin in FY19 or FY20. For the submarine enterprise, the step change was already envisioned and investment plans that embraced a growth trajectory were already being formulated. Increasing demand by adding additional submarines will require scaling facility and workforce development plans to operate at a higher rate of production. The nuclear shipyards would also look to increase material procurement proportionally to the increased demand. In some cases, the shipyard facilities may be constrained with existing

capacity and may look to source additional work in the supply base where capacity exists or where there are competitive business advantages to be realized. Creating additional capacity in the supply base will require non-recurring investment in supplier qualification, facilities, capital equipment and workforce training and development.

Industry is more likely to increase investment in new capability and capacity if there is certainty that the Navy will proceed with a stable shipbuilding plan. Positive signals of commitment from the Government must go beyond a published 30-year Navy Shipbuilding Plan and line items in the Future Years Defense Plan (FYDP) and should include

- Multi-year contracting for Block procurement which provides stability in the industrial base and encourages investment in facilities and workforce development
- Funding for supplier development to support training, qualification, and facilitization efforts—Electric Boat and Newport News have recommended to the Navy funding of $400M over a three-year period starting in 2018 to support supplier development for the Submarine Industrial Base as part of an Integrated Enterprise Plan Extended Enterprise initiative
- Acceleration of Advance Procurement and/or Economic Order Quantities (EOQ) procurement from FY19 to FY18 for Virginia Block V
- Government incentives for construction readiness and facilities / special tooling for shipyard and supplier facilities, which help cash flow capital investment ahead of construction contract awards
- Procurement of additional production back-up (PBU) material to help ensure a ready supply of material to mitigate construction schedule risk....

So far, this testimony has focused on the Submarine Industrial Base, but the General Dynamics Marine Systems portfolio also includes surface ship construction. Unlike Electric Boat, Bath Iron Works and NASSCO are able to support increased demand without a significant increase in resources.....

Bath Iron Works is well positioned to support the Administration's announced goal of increasing the size of the Navy fleet to 355 ships. For BIW that would mean increasing the total current procurement rate of two DDG 51s per year to as many as four DDGs per year, allocated equally between BIW and HII. This is the same rate that the surface combatant industrial base sustained over the first decade of full rate production of the DDG 51 Class (1989-1999)....

No significant capital investment in new facilities is required to accommodate delivering two DDGs per year. However, additional funding will be required to train future shipbuilders and maintain equipment. Current hiring and training processes support the projected need, and have proven to be successful in the recent past. BIW has invested significantly in its training programs since 2014 with the restart of the DDG 51 program and given these investments and the current market in Maine, there is little concern of meeting the increase in resources required under the projected plans.

A predictable and sustainable Navy workload is essential to justify expanding hiring/training programs. BIW would need the Navy's commitment that the Navy's plan will not change before it would proceed with additional hiring and training to support increased production.

BIW's supply chain is prepared to support a procurement rate increase of up to four DDG 51s per year for the DDG 51 Program. BIW has long-term purchasing agreements in place for all major equipment and material for the DDG 51 Program. These agreements provide for material lead time and pricing, and are not constrained by the number of ships ordered in a year. BIW confirmed with all of its critical suppliers that they can support this increased procurement rate....

> The Navy's Force Structure Assessment calls for three additional ESBs. Additionally, NASSCO has been asked by the Navy and the Congressional Budget Office (CBO) to evaluate its ability to increase the production rate of T-AOs to two ships per year. NASSCO has the capacity to build three more ESBs at a rate of one ship per year while building two T-AOs per year. The most cost effective funding profile requires funding ESB 6 in FY18 and the following ships in subsequent fiscal years to avoid increased cost resulting from a break in the production line. The most cost effective funding profile to enable a production rate of two T-AO ships per year requires funding an additional long lead time equipment set beginning in FY19 and an additional ship each year beginning in FY20.
>
> NASSCO must now reduce its employment levels due to completion of a series of commercial programs which resulted in the delivery of six ships in 2016. The proposed increase in Navy shipbuilding stabilizes NASSCO's workload and workforce to levels that were readily demonstrated over the last several years.
>
> Some moderate investment in the NASSCO shipyard will be needed to reach this level of production. The recent CBO report on the costs of building a 355-ship Navy accurately summarized NASSCO's ability to reach the above production rate stating, "building more … combat logistics and support ships would be the least problematic for the shipyards."[90]

At the same hearing, Brian Cuccias, president, Ingalls Shipbuilding, Huntington Ingalls Industries (the country's other principal builder of Navy ships) stated the following:

> Qualifying to be a supplier is a difficult process. Depending on the commodity, it may take up to 36 months. That is a big burden on some of these small businesses. This is why creating sufficient volume and exercising early contractual authorization and advance procurement funding is necessary to grow the supplier base, and not just for traditional long-lead time components; that effort needs to expand to critical components and commodities that today are controlling the build rate of submarines and carriers alike. Many of our suppliers are small businesses and can only make decisions to invest in people, plant and tooling when they are awarded a purchase order. We need to consider how we can make commitments to suppliers early enough to ensure material readiness and availability when construction schedules demand it.
>
> With questions about the industry's ability to support an increase in shipbuilding, both Newport News and Ingalls have undertaken an extensive inventory of our suppliers and assessed their ability to ramp up their capacity. We have engaged many of our key suppliers to assess their ability to respond to an increase in production.
>
> The fortunes of related industries also impact our suppliers, and an increase in demand from the oil and gas industry may stretch our supply base. Although some low to moderate risk remains, I am convinced that our suppliers will be able to meet the forecasted Navy demand....
>
> I strongly believe that the fastest results can come from leveraging successful platforms on current hot production lines. We commend the Navy's decision in 2014 to use the existing LPD 17 hull form for the LX(R), which will replace the LSD-class amphibious dock landing ships scheduled to retire in the coming years. However, we also recommend that the concept of commonality be taken even further to best optimize efficiency, affordability and capability. Specifically, rather than continuing with a new design for LX(R) within the "walls" of the LPD hull, we can leverage our hot production line and supply chain and offer the Navy a variant of the existing LPD design that satisfies the aggressive cost targets of the LX(R) program while delivering more capability and survivability to the fleet at a

[90] John P. Casey, Executive Vice President – Marine Systems, General Dynamics Corporation, Testimony before the Senate Armed Services Committee, Subcommittee on Seapower, 115th Congress, Supporting the 355-Ship Navy with Focus on Submarine Industrial Base, Washington, DC, May 24, 2017, pp. 3-18. See also Marjorie Censer, "BWX Technologies Weighs When To Ready for Additional Submarines," *Inside the Navy*, May 29, 2017.

> significantly faster pace than the current program. As much as 10-15 percent material savings can be realized across the LX(R) program by purchasing respective blocks of at least five ships each under a multi-year procurement (MYP) approach. In the aggregate, continuing production with LPD 30 in FY18, coupled with successive MYP contracts for the balance of ships, may yield savings greater than $1 billion across an 11-ship LX(R) program. Additionally, we can deliver five LX(R)s to the Navy and Marine Corps in the same timeframe that the current plan would deliver two, helping to reduce the shortfall in amphibious warships against the stated force requirement of 38 ships.
>
> Multi-ship procurements, whether a formal MYP or a block-buy, are a proven way to reduce the price of ships. The Navy took advantage of these tools on both Virginia-class submarines and Arleigh Burke-class destroyers. In addition to the LX(R) program mentioned above, expanding multi-ship procurements to other ship classes makes sense....
>
> The most efficient approach to lower the cost of the Ford class and meet the goal of an increased CVN fleet size is also to employ a multi-ship procurement strategy and construct these ships at three-year intervals. This approach would maximize the material procurement savings benefit through economic order quantities procurement and provide labor efficiencies to enable rapid acquisition of a 12-ship CVN fleet. This three-ship approach would save at least $1.5 billion, not including additional savings that could be achieved from government-furnished equipment. As part of its Integrated Enterprise Plan, we commend the Navy's efforts to explore the prospect of material economic order quantity purchasing across carrier and submarine programs.[91]

At the same hearing, Matthew O. Paxton, president, Shipbuilders Council of America (SCA)—a trade association representing shipbuilders, suppliers, and associated firms—stated the following:

> To increase the Navy's Fleet to 355 ships, a substantial and sustained investment is required in both procurement and readiness. However, let me be clear: building and sustaining the larger required Fleet is achievable and our industry stands ready to help achieve that important national security objective.
>
> To meet the demand for increased vessel construction while sustaining the vessels we currently have will require U.S. shipyards to expand their work forces and improve their infrastructure in varying degrees depending on ship type and ship mix – a requirement our Nation's shipyards are eager to meet. But first, in order to build these ships in as timely and affordable manner as possible, stable and robust funding is necessary to sustain those industrial capabilities which support Navy shipbuilding and ship maintenance and modernization....
>
> Beyond providing for the building of a 355-ship Navy, there must also be provision to fund the "tail," the maintenance of the current and new ships entering the fleet. Target fleet size cannot be reached if existing ships are not maintained to their full service lives, while building those new ships. Maintenance has been deferred in the last few years because of across-the-board budget cuts....
>
> The domestic shipyard industry certainly has the capability and know-how to build and maintain a 355-ship Navy. The Maritime Administration determined in a recent study on the Economic Benefits of the U.S. Shipyard Industry that there are nearly 110,000 skilled men and women in the Nation's private shipyards building, repairing and maintaining America's military and commercial fleets.1 The report found the U.S. shipbuilding industry supports nearly 400,000 jobs across the country and generates $25.1 billion in income and $37.3 billion worth of goods and services each year. In fact, the MARAD report found that the shipyard industry creates direct and induced employment in every

[91] Statement of Brian Cuccias, President, Ingalls Shipbuilding, Huntington Ingalls Industries, Subcommittee on Seapower, Senate Armed Services Committee, May 24, 2017, pp. 4-11.

> State and Congressional District and each job in the private shipbuilding and repairing industry supports another 2.6 jobs nationally.
>
> This data confirms the significant economic impact of this manufacturing sector, but also that the skilled workforce and industrial base exists domestically to build these ships. Long-term, there needs to be a workforce expansion and some shipyards will need to reconfigure or expand production lines. This can and will be done as required to meet the need if adequate, stable budgets and procurement plans are established and sustained for the long-term. Funding predictability and sustainability will allow industry to invest in facilities and more effectively grow its skilled workforce. The development of that critical workforce will take time and a concerted effort in a partnership between industry and the federal government.
>
> U.S. shipyards pride themselves on implementing state of the art training and apprenticeship programs to develop skilled men and women that can cut, weld, and bend steel and aluminum and who can design, build and maintain the best Navy in the world. However, the shipbuilding industry, like so many other manufacturing sectors, faces an aging workforce. Attracting and retaining the next generation shipyard worker for an industry career is critical. Working together with the Navy, and local and state resources, our association is committed to building a robust training and development pipeline for skilled shipyard workers. In addition to repealing sequestration and stabilizing funding the continued development of a skilled workforce also needs to be included in our national maritime strategy....
>
> In conclusion, the U.S. shipyard industry is certainly up to the task of building a 355-ship Navy and has the expertise, the capability, the critical capacity and the unmatched skilled workforce to build these national assets. Meeting the Navy's goal of a 355-ship fleet and securing America's naval dominance for the decades ahead will require sustained investment by Congress and Navy's partnership with a defense industrial base that can further attract and retain a highly-skilled workforce with critical skill sets. Again, I would like to thank this Subcommittee for inviting me to testify alongside such distinguished witnesses. As a representative of our nation's private shipyards, I can say, with confidence and certainty, that our domestic shipyards and skilled workers are ready, willing and able to build and maintain the Navy's 355-ship Fleet.[92]

Employment Impact

Building the additional ships that would be needed to achieve and maintain the 355-ship fleet could create many additional manufacturing and other jobs at shipyards, associated supplier firms, and elsewhere in the U.S. economy. A 2015 Maritime Administration (MARAD) report states

> Considering the indirect and induced impacts, each direct job in the shipbuilding and repairing industry is associated with another 2.6 jobs in other parts of the US economy; each dollar of direct labor income and GDP in the shipbuilding and repairing industry is associated with another $1.74 in labor income and $2.49 in GDP, respectively, in other parts of the US economy.[93]

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[92] Testimony of Matthew O. Paxton, President, Shipbuilders Council of America, before the United States Senate Committee on Armed Services, Subcommittee on Seapower, [on] Industry Perspectives on Options and Considerations for Achieving a 355-Ship Navy, May 24, 2017, pp. 3-8.

[93] MARAD, *The Economic Importance of the U.S. Shipbuilding and Repairing Industry*, November 2015, pp. E-3, E-4. For another perspective on the issue of the impact of shipbuilding on the broader economy, see Edward G. Keating et al., *The Economic Consequences of Investing in Shipbuilding, Case Studies in the United States and Sweden*, RAND Corporation, 2015.

A March 2017 press report states, "Based on a 2015 economic impact study, the Shipbuilders Council of America [a trade association for U.S. shipbuilders and associated supplier firms] believes that a 355-ship Navy could add more than 50,000 jobs nationwide."[94] The 2015 economic impact study referred to in that quote might be the 2015 MARAD study discussed in the previous paragraph. An estimate of more than 50,000 additional jobs nationwide might be viewed as a higher-end estimate; other estimates might be lower. A June 14, 2017, press report states the following: "The shipbuilding industry will need to add between 18,000 and 25,000 jobs to build to a 350-ship Navy, according to Matthew Paxton, president of the Shipbuilders Council of America, a trade association representing the shipbuilding industrial base. Including indirect jobs like suppliers, the ramp-up may require a boost of 50,000 workers."[95]

[94] Yasmin Tadjdeh, "Navy Shipbuilders Prepared for Proposed Fleet Buildup," *National Defense*, March 2017. Similarly, another press report states the following: "The Navy envisioned by Trump could create more than 50,000 jobs, the Shipbuilders Council of America, a trade group representing U.S. shipbuilders, repairers and suppliers, told Reuters." (Mike Stone, "Missing from Trump's Grand Navy Plan: Skilled Workers to Build the Fleet," *Reuters*, March 17, 2017.)

[95] Jaqueline Klimas, "Growing Shipbuilding Workforce Seen as Major Challenge for Trump's Navy Buildup," *Politico*, June 14, 2017.

Appendix E. 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.

Appendix F. Some Considerations Relating to Warranties in Shipbuilding Contracts

This appendix presents some considerations relating to warranties in shipbuilding contracts and other defense acquisition.

In discussions of Navy (and also Coast Guard) shipbuilding, one question that sometimes arises is whether including a warranty in a shipbuilding contract is preferable to not including one. The question can arise, for example, in connection with a GAO finding that "the Navy structures shipbuilding contracts so that it pays shipbuilders to build ships as part of the construction process and then pays the same shipbuilders a second time to repair the ship when construction defects are discovered."[96]

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

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

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

From a cost standpoint, including a warranty in the contract might or might not be preferable, depending on the risk that there will be problems with earlier work that need fixing, the potential cost of fixing such problems, and the cost of including the warranty in the contract. The point is that the goal of avoiding highly visible payments for fixing problems with earlier work and the goal of minimizing the cost to the government of fixing problems with earlier work are separate and different goals, and that pursuing the first goal can sometimes work against achieving the second goal.[97]

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

[97] It can also be noted that the country's two largest builders of Navy ships—General Dynamics (GD) and Huntington Ingalls Industries (HII)—derive about 60% and 96%, respectively, of their revenues from U.S. government work. (See General Dynamics, *2016 Annual Report*, page 9 of Form 10-K [PDF page 15 of 88]) and Huntington Ingalls Industries,

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

> Federal Acquisition Regulation (FAR) 46.7 states that "the use of warranties is not mandatory." However, if the benefits to be derived from the warranty are commensurate with the cost of the warranty, the CO [contracting officer] should consider placing it in the contract. In determining whether a warranty is appropriate for a specific acquisition, FAR Subpart 46.703 requires the CO to consider the nature and use of the supplies and services, the cost, the administration and enforcement, trade practices, and reduced requirements. The rationale for using a warranty should be documented in the contract file....
>
> In determining the value of a warranty, a CBA [cost-benefit analysis] is used to measure the life cycle costs of the system with and without the warranty. A CBA is required to determine if the warranty will be cost beneficial. CBA is an economic analysis, which basically compares the Life Cycle Costs (LCC) of the system with and without the warranty to determine if warranty coverage will improve the LCCs. In general, five key factors will drive the results of the CBA: cost of the warranty + cost of warranty administration + compatibility with total program efforts + cost of overlap with Contractor support + intangible savings. Effective warranties integrate reliability, maintainability, supportability, availability, and life-cycle costs. Decision factors that must be evaluated include the state of the weapon system technology, the size of the warranted population, the likelihood that field performance requirements can be achieved, and the warranty period of performance.[98]

2016 Annual Report, page 5 of Form 10-K [PDF page 19 of 134]). These two shipbuilders operate the only U.S. shipyards currently capable of building several major types of Navy ships, including submarines, aircraft carriers, large surface combatants, and amphibious ships. Thus, even if a warranty in a shipbuilding contract with one of these firms were to somehow mean that the government did not have pay under the terms of that contract—either up front or later on—for fixing problems with earlier work done under that contract, there would still be a question as to whether the government would nevertheless wind up eventually paying much of that cost as part of the price of one or more future contracts the government may have that firm.

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

Appendix G. Avoiding Procurement Cost Growth vs. Minimizing Procurement Costs

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

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

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

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

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

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

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

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

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

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

Appendix H. Size of the Navy and Navy Shipbuilding Rate

Size of the Navy

Table H-1 shows the size of the Navy in terms of total number of ships since FY1948; the numbers shown in the table reflect changes over time in the rules specifying which ships count toward the total. Differing counting rules result in differing totals, and for certain years, figures reflecting more than one set of counting rules are available. Figures in the table for FY1978 and subsequent years reflect the battle force ships counting method, which is the set of counting rules established in the early 1980s for public policy discussions of the size of the Navy.

As shown in the table, the total number of battle force ships in the Navy reached a late-Cold War peak of 568 at the end of FY1987 and began declining thereafter.[99] The Navy fell below 300 battle force ships in August 2003 and as of March 13, 2020, included 296 battle force ships.

As discussed in **Appendix C**, historical figures for total fleet size might not be a reliable yardstick for assessing the appropriateness of proposals for the future size and structure of the Navy, particularly if the historical figures are more than a few years old, because the missions to be performed by the Navy, the mix of ships that make up the Navy, and the technologies that are available to Navy ships for performing missions all change over time, and because the number of ships in the fleet in an earlier year might itself have been inappropriate (i.e., not enough or more than enough) for meeting the Navy's mission requirements in that year.

For similar reasons, trends over time in the total number of ships in the Navy are not necessarily a reliable indicator of the direction of change in the fleet's ability to perform its stated missions. An increasing number of ships in the fleet might not necessarily mean that the fleet's ability to perform its stated missions is increasing, because the fleet's mission requirements might be increasing more rapidly than ship numbers and average ship capability. Similarly, a decreasing number of ships in the fleet might not necessarily mean that the fleet's ability to perform stated missions is decreasing, because the fleet's mission requirements might be declining more rapidly than numbers of ships, or because average ship capability and the percentage of time that ships are in deployed locations might be increasing quickly enough to more than offset reductions in total ship numbers.

[99] Some publications have stated that the Navy reached a peak of 594 ships at the end of FY1987. This figure, however, is the total number of active ships in the fleet, which is not the same as the total number of battle force ships. The battle force ships figure is the number used in government discussions of the size of the Navy. In recent years, the total number of active ships has been larger than the total number of battle force ships. For example, the Naval History and Heritage Command (formerly the Naval Historical Center) states that as of November 16, 2001, the Navy included a total of 337 active ships, while the Navy states that as of November 19, 2001, the Navy included a total of 317 battle force ships. Comparing the total number of active ships in one year to the total number of battle force ships in another year is thus an apples-to-oranges comparison that in this case overstates the decline since FY1987 in the number of ships in the Navy. As a general rule to avoid potential statistical distortions, comparisons of the number of ships in the Navy over time should use, whenever possible, a single counting method.

Table H-1. Total Number of Ships in Navy Since FY1948

FY[a]	Number	FY[a]	Number	FY[a]	Number	FY[a]	Number
1948	737	1970	769	1992	466	2014	289
1949	690	1971	702	1993	435	2015	271
1950	634	1972	654	1994	391	2016	275
1951	980	1973	584	1995	373	2017	279
1952	1,097	1974	512	1996	356	2018	286
1953	1,122	1975	496	1997	354	2019	290
1954	1,113	1976	476	1998	333		
1955	1,030	1977	464	1999	317		
1956	973	1978	468	2000	318		
1957	967	1979	471	2001	316		
1958	890	1980	477	2002	313		
1959	860	1981	490	2003	297		
1960	812	1982	513	2004	291		
1961	897	1983	514	2005	282		
1962	959	1984	524	2006	281		
1963	916	1985	541	2007	279		
1964	917	1986	556	2008	282		
1965	936	1987	568	2009	285		
1966	947	1988	565	2010	288		
1967	973	1989	566	2011	284		
1968	976	1990	547	2012	287		
1969	926	1991	526	2013	285		

Source: Compiled by CRS using U.S. Navy data. Numbers shown reflect changes over time in the rules specifying which ships count toward the total. Figures for FY1978 and subsequent years reflect the battle force ships counting method, which is the set of counting rules established in the early 1980s for public policy discussions of the size of the Navy.

a. Data for earlier years in the table may be for the end of the calendar year (or for some other point during the year), rather than for the end of the fiscal year.

Shipbuilding Rate

Table H-2 shows past (FY1982-FY2019) and requested or programmed (FY2020-FY2024) rates of Navy ship procurement.

Table H-2. Battle Force Ships Procured or Requested, FY1982-FY2024

(Procured in FY1982-FY2019; *requested for FY2020, and programmed for FY2021-FY2024*)

82	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**00**
17	14	16	19	20	17	15	19	15	11	11	7	4	4	5	4	5	5	6
01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	***18***	***19***
6	6	5	7	8	4	5	3	8	7	10	11	11	8	8	9	9	*9*	*13*
20	***21***	**22**	***23***	***24***	***25***													
13	*7*	*7*	*8*	*11*	*9*													

Source: CRS compilation based on Navy budget data and examination of defense authorization and appropriation committee and conference reports for each fiscal year. The table excludes nonbattle force ships that do not count toward the 355-ship goal, such as certain sealift and prepositioning ships operated by the Military Sealift Command and oceanographic ships operated by agencies such as the National Oceanic and Atmospheric Administration (NOAA).

Notes: (1) **The totals shown for FY2006, FY2007, and FY2008**, reflect the cancellation two LCSs funded in FY2006, another two LCSs funded in FY2007, and an LCS funded in FY2008.

(2) **The total shown for FY2012** includes two JHSVs—one that was included in the Navy's FY2012 budget submission, and one that was included in the Army's FY2012 budget submission. Until FY2012, JHSVs were being procured by both the Navy and the Army. The Army was to procure its fifth and final JHSV in FY2012, and this ship was included in the Army's FY2012 budget submission. In May 2011, the Navy and Army signed a Memorandum of Agreement (MOA) transferring the Army's JHSVs to the Navy. In the FY2012 DOD Appropriations Act (Division A of H.R. 2055/P.L. 112-74 of December 23, 2011), the JHSV that was in the Army's FY2012 budget submission was funded through the Shipbuilding and Conversion, Navy (SCN) appropriation account, along with the JHSV that the Navy had included in its FY0212 budget submission. The four JHSVs that were procured through the Army's budget prior to FY2012, however, are not included in the annual totals shown in this table.

(3) **The figures shown for FY2019 and FY2020** reflect a Navy decision to show the aircraft carrier CVN-81 as a ship to be procured in FY2020 rather than a ship that was procured in FY2019. Congress, as part of its action on the Navy's proposed FY2019 budget, authorized the procurement of CVN-81 in FY2019.

Appendix I. Procurement Dates of CVN-81, LPD-31, and LHA-9

This appendix presents background information on congressional action regarding the procurement dates of three ships—the aircraft carrier CVN-81, the LPD-17 Flight II amphibious ship LPD-31, and the amphibious assault ship LHA-9. In reviewing the bullet points presented below, it can be noted that procurement funding is funding for a ship that is either being procured in that fiscal year or has been procured in a prior fiscal year, while advance procurement (AP) funding is funding for a ship that is to be procured in a future fiscal year.[100]

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. Consistent with congressional action on the Navy's FY2019 budget regarding the procurement of CVN-81, this CRS report treats CVN-81 as a ship that Congress procured (i.e., authorized and provided procurement funding for) in FY2019. Discussion in this CRS report of the Navy's FY2021 budget submission is adjusted to show CVN-81 as a ship that was procured in FY2019. This CRS report treats CVN-81 as a ship that Congress procured in FY2019 consistent with the following:

- 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."[101] 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

[100] For additional discussion, see CRS Report RL31404, *Defense Procurement: Full Funding Policy—Background, Issues, and Options for Congress*, by Ronald O'Rourke and Stephen Daggett.

[101] H.Rept. 115-874, p. 1164.

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).[102]
- 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).[103]
- 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."[104]
- 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."[105]
- 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."[106]
- 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.[107]
- 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.[108]

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. Consistent with congressional action on the Navy's FY2020 budget regarding the procurement of LPD-31, this CRS report treats LPD-31 as a ship that Congress procured (i.e., authorized and provided procurement funding for) in FY2020. Discussion in this CRS report of the Navy's FY2021 budget submission is adjusted to show LPD-

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

[103] *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).

[104] H.Rept. 116-120, p. 378, line 002.

[105] S.Rept. 116-48, p. 432, line 2.

[106] H.Rept. 116-333, p. 1565, line 002.

[107] H.Rept. 116-84, p. 173, line 2.

[108] S.Rept. 116-103, p. 118, line XX.

31 as a ship that was procured in FY2020. This CRS report treats LPD-31 as a ship that Congress procured in FY2020 consistent with the following:

- 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.[109]
- 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.[110]
- 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.[111] 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.[112]
- 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 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.[113]

[109] H.Rept. 116-120, p. 379, line 012.

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

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

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

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

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. Consistent with congressional action on the Navy's FY2020 budget regarding the procurement of LHA-9, this CRS report treats LHA-9 as a ship that Congress procured (i.e., authorized and provided procurement funding for) in FY2020. Discussion in this CRS report of the Navy's FY2021 budget submission is adjusted to show LHA-9 as a ship that was procured in FY2020. This CRS report treats LHA-9 as a ship that Congress procured in FY2020 consistent with the following:

- 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.[114]
- 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.[115] 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.[116]
- 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.[117]

[114] S.Rept. 116-48, p. 433, line 15.

[115] H.Rept. 116-333, p. 1566, line 015.

[116] S.Rept. 116-103, p. 118, line 15.

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

Appendix J. Letter to DOD from Members of Congress from Maine Regarding COVID-19 (Coronavirus) Impact on Defense Industry

This appendix presents the text of a March 19, 2020, letter from Members of Congress from Maine to the Secretary of Defense and the Secretary of the Navy "about the stability of the defense industrial base as the whole nation combats the current novel coronavirus (COVD-19) outbreak." The text is as follows:

> We are deeply concerned about the stability of the defense industrial base as the whole nation combats the current novel coronavirus (COVID-19) outbreak. We are equally worried about the health and safety risks to the industrial bases' primary asset—its skilled workforce—as defense companies struggle to support our nation's military while also managing the unique challenge we face today.
>
> In Maine, workers at shipbuilder Bath Iron Works, as well as at other defense suppliers of all sizes, must now contend with significant health concerns at work while also arranging to care for their children who are now staying at home due to school closures. The strain and stress on our skilled workforce today are without recent precedent. Given these challenges, the Department of Defense and the Navy must immediately act to protect our nation's defense industrial base, including our nation's shipyards.
>
> First, we ask that you work to mitigate cash flow and other financial burdens that contractors and subcontractors may face during this time of crisis. This includes providing clear guidance and relief from contract requirements that are uniquely impacted by COVID-19. Additionally, we ask that you take any actions possible to accelerate or advance payments or new contract obligations in order to provide immediate stability to the industrial base. If additional funding or new legal authorities are required to provide such assistance to industry, we stand ready to immediately assist the Department.
>
> Finally, we ask that you clarify your planning and public guidance to ensure a stable industrial base while also ensuring the health and safety of the defense industrial base workforce. The safety of defense industry workers is paramount, and we are mindful that insufficiently mitigating the impact of COVID-19 now could lead to deeper impacts in later months or years if this pandemic continues for an extended period. An outbreak of COVID-19 at one of our nation's shipyards or other large defense contractors could truly be devastating to our national defense. We ask you to work with and support industry to take all necessary protective actions.
>
> Thank you for your attention to the important issue, and we look forward to your quick response.[118]

[118] The letter was accessed on March 20, 2020, at: https://www.collins.senate.gov/sites/default/files/2020.03.19%20-%20ME%20Delegation%20letter%20to%20DOD%20and%20Navy%20re%20defense%20industrial%20base.pdf. For a press report about this letter, see Aaron Mehta, "Maine Lawmakers Want Contract Relief, Quicker Payments for Industry to Combat COVID-19 Impact," *Defense News*, March 19, 2020.

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