Navy LX(R) Amphibious Ship Program: Background and Issues for Congress

(name redacted)
Specialist in Naval Affairs

December 8, 2017

Congressional Research Service
7-....
www.crs.gov
R43543

CRS REPORT
Prepared for Members and
Committees of Congress

Summary

The LX(R) program is a program to build a new class of amphibious ships for the Navy. LX(R)s are to replace 12 aging Whidbey Island/Harpers Ferry (LSD-41/49) class amphibious ships, the first of which will reach age 40 in 2025.

Under the Navy's previous force-level goal to achieve and maintain a fleet of 308 ships, including 34 amphibious ships, the Navy had planned to procure a total of 11 LX(R)s. In December 2016, the Navy released a new force-level goal to achieve and maintain a fleet of 355 ships, including 38 amphibious ships. Under this new force level goal, the total planned number of LX(R)s may be increased to 13.

The procurement of the first LX(R) is scheduled in the Navy's five-year (FY2018-FY2022) shipbuilding plan for FY2020. To accelerate the procurement of the first LX(R) from FY2020 to FY2019, Congress provided $236 million in advance procurement (AP) funding for the LX(R) program in FY2016. As part of its action on the Navy's FY2017 budget, however, Congress realigned this funding to instead help fund the procurement in FY2017 of a 13th San Antonio (LPD-17) class amphibious ship. As a result of this funding realignment, the procurement date of the lead LX(R) reverted to FY2020. Navy officials state that the procurement of the first LX(R) can once again be accelerated from FY2020 to FY2019 by providing $98.7 million in advance procurement (AP) funding for the program in FY2018 or FY2019.

The design of the LX(R) is to be derived from the design of the Navy's LPD-17 class amphibious ships. The LX(R) design is a less expensive and (in some ways) less capable derivative of the LPD-17 design. The LX(R) design was developed to stay within a unit procurement cost target that the Navy had established for the LX(R) program.

The Navy's proposed FY2018 budget requests no procurement or advance procurement (AP) funding for procuring LPD-17 class ships or LX(R)s; it requests $9.6 million in research and development funds for the LX(R) program.

Issues for Congress for FY2018 regarding the LX(R) program and LPD-17 class ships include the following:

- whether to approve, reject, or modify the Navy's FY2018 funding requests for the LX(R) program, including whether to provide funding intended to accelerate the procurement of the first LX(R) to FY2019;
- whether to provide funding for the procurement in FY2018 of a 14th LPD-17 class ship, so as to accelerate the attainment of the Navy's desired 38-ship amphibious force and further close the gap between the end of LPD-17 procurement and the start of LX(R) procurement; and
- whether LX(R)s should be built to the Navy's currently planned LX(R) design, or to a more expensive and (in some ways) more capable design that is closer to that of the LPD-17 design.

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Introduction

This report provides background information and issues for Congress on the LX(R) program, a program to build a new class of amphibious ships for the Navy. The Navy wants to procure the first LX(R) in FY2020. The Navy's proposed FY2018 budget requests $9.6 million in research and development funds for the LX(R) program. Decisions Congress makes on the LX(R) program will affect Navy capabilities and funding requirements, and the U.S. shipbuilding industrial base.

For an overview of the strategic and budgetary context in which the LX(R) program and other Navy shipbuilding programs may be considered, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by (name redacted) .

Background

Amphibious Ships in General

Roles and Missions of Amphibious Ships

The primary function of Navy amphibious ships is to lift (i.e., transport) U.S. Marines and their equipment and supplies to distant operating areas, and enable Marines to conduct expeditionary operations ashore in those areas. Although amphibious ships are designed to support Marine landings against opposing military forces, they are also used for operations in permissive or benign situations where there are no opposing forces. Due to their large storage spaces and their ability to use helicopters and landing craft to transfer people, equipment, and supplies from ship to shore without need for port facilities,[1] amphibious ships are potentially useful for a range of combat and non-combat operations.[2]

On any given day, some of the Navy's amphibious ships, like some of the Navy's other ships, are forward-deployed to various overseas operating areas. Forward-deployed U.S. Navy amphibious

[1] Amphibious ships have berthing spaces for Marines; storage space for their wheeled vehicles, their other combat equipment, and their supplies; flight decks and hangar decks for their helicopters and vertical take-off and landing (VTOL) fixed-wing aircraft; and well decks for storing and launching their landing craft. (A well deck is a large, garage-like space in the stern of the ship. It can be flooded with water so that landing craft can leave or return to the ship. Access to the well deck is protected by a large stern gate that is somewhat like a garage door.)

[2] Amphibious ships and their embarked Marine forces can be used for launching and conducting humanitarian-assistance and disaster-response (HA/DR) operations; peacetime engagement and partnership-building activities, such as exercises; other nation-building operations, such as reconstruction operations; operations to train, advise, and assist foreign military forces; peace-enforcement operations; non-combatant evacuation operations (NEOs); maritime-security operations, such as anti-piracy operations; smaller-scale strike and counter-terrorism operations; and larger-scale ground combat operations. Amphibious ships and their embarked Marine forces can also be used for maintaining forward-deployed naval presence for purposes of deterrence, reassurance, and maintaining regional stability.

Although the Marines have not conducted a large-scale amphibious assault against opposing military forces since the Korean conflict, Marine Corps officials stated in 2008 that about 85 U.S. amphibious operations of other kinds were conducted between 1990 and April 2008. (Source: Marine Corps briefing to CRS on April 25, 2008.) In addition, presenting the potential for conducting an amphibious landing can generate tactical benefits, even if the landing is not carried out. During the 1991 Persian Gulf conflict, for example, the potential for conducting an amphibious landing by a force of about 17,000 Marines embarked on amphibious ships in the Persian Gulf tied down several Iraqi divisions in coastal-defense positions. Those Iraqi divisions' positions were not available for use against U.S.-coalition ground forces moving north from Saudi Arabia. (See CRS Report 91-421, *Persian Gulf War: Defense Policy Implications for Congress*, coordinated by Ronald O'Rourke, p. 41 [May 15, 1991; out of print and available directly from the report coordinator.])

ships are often organized into three-ship formations called amphibious ready groups (ARGs).[3] On average, two or perhaps three ARGs might be forward-deployed at any given time. Amphibious ships are also sometimes forward-deployed on an individual basis to lower-threat operating areas, particularly for conducting peacetime engagement activities with foreign countries or for responding to smaller-scale contingencies.

Types of Amphibious Ships

Navy amphibious ships can be divided into two main groups—the so-called "big-deck" amphibious assault ships, designated LHA and LHD, which look like medium-sized aircraft carriers, and the smaller (but still sizeable) amphibious ships designated LPD or LSD, which are sometimes called "small-deck" amphibious ships.

U.S. Navy amphibious ships have designations starting with the letter L, as in amphibious *landing*. LHA can be translated as landing ship, helicopter-capable, assault; LHD can be translated as landing ship, helicopter-capable, well deck; LPD can be translated as landing ship, helicopter platform, well deck; and LSD can be translated as landing ship, well deck. Whether noted in the designation or not, almost all these ships have well decks.[4] In the designation LX(R), the X means that the exact design of the ship has not yet been determined, and the R means it is intended as a replacement for existing ships.

The LHAs and LHDs have large flight decks and hangar decks for embarking and operating numerous helicopters and vertical or short takeoff and landing (V/STOL) fixed-wing aircraft, while the LSDs and LPDs have much smaller flight decks and hangar decks for embarking and operating smaller numbers of helicopters. The LHAs and LHDs, as bigger ships, in general can individually embark more Marines and equipment than the LSDs and LPDs.

Amphibious Lift Goal

The Navy's previous 308-ship force-level goal called for achieving and maintaining a 34-ship amphibious force that includes 11 LHA/LHD-type amphibious assault ships, 12 San Antonio (LPD-17) class amphibious ships, and 11 LSD/LX(R)-type amphibious ships (11+12+11).[5] The

[3] An ARG notionally includes three amphibious ships—one LHA or LHD, one LSD, and one LPD. These three amphibious ships together can embark a Marine expeditionary unit (MEU) consisting of about 2,200 Marines, their aircraft, their landing craft, their combat equipment, and about 15 days' worth of supplies. ARGs can operate in conjunction with carrier strike groups (CSGs) to form larger naval task forces; ARGs can also be broken up into individual ships that are sent to separate operating areas.

[4] The exceptions are LHAs 6 and 7, which do not have well decks and instead have expanded aviation support capabilities. For an explanation of well decks, see footnote 1.

[5] Navy and Marine Corps officials had previously agreed that a 33-ship (11+11+11) force would minimally meet the Marine Corps' goal of having an amphibious ship force with enough combined capacity to lift the assault echelons (AEs) of 2.0 Marine Expeditionary Brigades (MEBs). A 33-ship force would include 15 amphibious ships for each MEB, plus 3 additional ships to account for roughly 10% of the amphibious ship force being in overhaul at any given time. In February and March 2015 testimony, however, the Navy explained that the 33-ship (11+11+11) requirement had been revised to a 34-ship (11+12+11) requirement to reflect the procurement in FY2016 of a 12th LPD-17 class ship. (See, for example, the spoken remarks of Vice Admiral Joseph P. Mulloy, Deputy Chief of Naval Operations for Integration of Capabilities and Resources, at a February 25, 2015, hearing on Department of the Navy acquisition programs before the Seapower and Projection Forces subcommittee of the House Armed Services Committee, and at a March 18, 2015, hearing on Navy shipbuilding issues before the Seapower subcommittee of the Senate Armed Services Committee, as reflected in the transcripts of the hearings.) Navy officials have explained to CRS that the amphibious ship force-level requirement, more precisely expressed, was between 33 and 34 ships, and could be rounded either down to 33 or up to 34, and that the figure, which had been rounded down to 33, was rounded up to 34 following the funding of the 12th LPD-17 class ship.

Navy's new 355-ship force-level goal, released in December 2016, calls for achieving and maintaining a 38-ship amphibious force that includes 12 LHA/LHD-type ships, 13 LPD-17 class ships, and 13 LSD-LX(R)-type ships (12+13+13).[6]

The goal for achieving and maintaining a force of 38 amphibious ships relates primarily to meeting wartime needs for amphibious lift. Navy and Marine Corps officials have testified that fully meeting U.S. regional combatant commander (CCDR) requests for day-to-day forward deployments of amphibious ships would require a force of 50 or more amphibious ships.[7]

Existing Force of LSD-41/49 Class Ships

The Navy's existing force of LSD-type ships includes 12 Whidbey Island/Harpers Ferry (LSD-41/49) class ships (**Figure 1**).[8] These ships were procured between FY1981 and FY1993 and entered service between 1985 and 1998. They have an expected service life of 40 years; the first ship will reach that age in 2025. The ships are about 609 feet long and have a full load displacement of about 16,800 tons. The class includes 12 ships because they were built at a time when the Navy was planning a 36-ship (12+12+12) amphibious force.

The first three LSD-41/49 class ships were built by Lockheed Shipbuilding of Seattle, WA, a firm that subsequently exited the Navy shipbuilding business. The final nine ships were built by Avondale Shipyards of New Orleans, LA, a shipyard that eventually became part of the shipbuilding firm Huntington Ingalls Industries (HII). Avondale, like Lockheed Shipbuilding, no longer builds Navy ships. HII continues to build amphibious ships at its Ingalls shipyard, located in Pascagoula, MS.[9]

[6] Marine Corps and Navy officials have agreed that, compared to a 33- or 34-ship amphibious force, a 38-ship amphibious force would more fully meet the Marine Corps' 2.0 MEB AE amphibious lift requirement. Such a force would include 17 amphibious ships for each MEB, plus 4 additional ships to account for ships in overhaul. For more on the Navy's 355-ship force-level goal, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by (name redacted) . For a more detailed review of the 33/34- and 38-ship force structure requirements, see Appendix A of CRS Report RL34476, *Navy LPD-17 Amphibious Ship Procurement: Background, Issues, and Options for Congress*, which is an archived report.

[7] For example, in testimony to the Seapower and Projection Forces subcommittee of the House Armed Services Committee on February 25, 2015, Marine Corps Lieutenant General Kenneth J. Glueck, Jr., Deputy Commandant for Combat Development and Integration and Commanding General of the Marine Corps Combat Development Command, stated that the number needed to fully meet COCOM demands for forward-deployed amphibious ships is "close to 54." (Source: Spoken testimony of Lieutenant General Glueck, as reflected in transcript of hearing.)

[8] The class was initially known as the Whidbey Island (LSD-41) class. The final four ships in the class, beginning with *Harpers Ferry* (LSD-49), were built to a modified version of the original LSD-41 design, prompting the name of the class to be changed to the Harpers Ferry/Whidbey Island (LSD-41/49) class. Some sources refer to these 12 ships as two separate classes.

[9] HII wound down Navy shipbuilding operations at Avondale in 2014, after Avondale finished building LPD-25, the ninth LPD-17 class ship. HII continues to operate two other shipyards that build Navy ships—Ingalls Shipbuilding in Pascagoula, MS (HII/Ingalls), and Newport News Shipbuilding in Newport News, VA (HII/NNS). HII's construction of amphibious ships, previously divided between Avondale and Ingalls, now takes place primarily at Ingalls. HII/NNS's work focuses primarily on building and overhauling aircraft carriers and building submarines.

Figure 1. LSD-41/49 Class Ship

Source: U.S. Navy photo accessed May 7, 2014, at http://www.navy.mil/gallery_search_results.asp?terms=lsd+52&page=4&r=4. The Navy's caption for the photo states that the photo is dated July 13, 2013, and that it shows the *Pearl Harbor* (LSD-52) anchored off Majuro atoll in the Republic of the Marshall Islands during an exercise called Pacific Partnership 2013.

LX(R) Program[10]

Total Planned Quantity

Consistent with the 34-ship amphibious force-level goal that formed part of the Navy's previous 308-ship force-level goal, the Navy previously envisaged building a total of 11 new LX(R)s as replacements for the 12 LSD-41/49 class ships. In light of the 38-ship force-level goal that forms part of the Navy's new 355-ship force-level goal, the planned total number of LX(R)s may be increased to 13.

Procurement Schedule

The procurement of the first LX(R) is scheduled in the Navy's five-year (FY2018-FY2022) shipbuilding plan for FY2020.[11] To accelerate the procurement of the first LX(R) from FY2020 to FY2019, Congress provided $236 million in advance procurement (AP) funding for the LX(R) program in FY2016. As part of its action on the Navy's FY2017 budget, however, Congress

[10] The LX(R) program was previously referred to as the LSD(X) program; the designation was changed to LX(R) in 2012 to signal that the replacement for the existing LSD-41/49 class ships would be an amphibious ship that would best meet future Navy and Marine Corps needs, regardless of whether that turns out to be a ship that one might refer to as an LSD. For an article discussing the change in the program's designation, see Christopher P. Cavas, "Different Missions Might Await New USN Amphib," *DefenseNews.com*, November 12, 2012.

[11] The Navy's FY2012 budget submission scheduled the procurement of the first LX(R) for FY2017. The Navy's FY2013, FY2014, and FY2015 budget submissions deferred the scheduled procurement of the first LX(R) progressively, to FY2018, FY2019, and FY2020, respectively.

realigned this funding to instead help fund the procurement in FY2017 of a 13th San Antonio (LPD-17) class amphibious ship.[12] As a result of this funding realignment, the procurement date of the lead LX(R) reverted to FY2020. Navy officials state that the procurement of the first LX(R) can once again be accelerated from FY2020 to FY2019 by providing a $98.7 million in advance procurement (AP) funding for the program in FY2018 or FY2019.[13]

Based on the FY2020 date for procuring the first LX(R), the Navy wants to procure the second and subsequent ships in the LX(R) program at a rate of at least one ship per year starting in FY2022.

Program Funding

Table 1 shows LX(R) program funding for FY2018-FY2022 as presented in the Navy's FY2018 budget submission.

Table 1. LX(R) Program Funding

Millions of dollars, rounded to nearest tenth

	FY18 (req.)	FY19 (proj.)	FY20 (proj.)	FY21 (proj.)	FY22 (proj.)
Research and development	9.6	5.7	12.8	12.6	3.3
Procurement	0	0	1,846.1	0	1,713.0

Source: Table prepared by CRS based on Navy FY2018 budget submission.

Notes: Research and development funding is PE (Program Element) 0604454N (LX(R)). Procurement funding in years prior to FY2020 is advance procurement (AP) funding for the first ship in the class, which is scheduled for procurement in FY2020.

Unit Procurement Cost Target

The Navy's unit procurement cost targets for the LX(R) program are $1,643 million in constant FY2014 dollars for the lead ship, and an average of $1,400 million in constant FY2014 dollars for ships 2 through 11.[14]

Analysis of Alternatives (AoA)

From the first quarter of FY2013 through March 2014, the Navy conducted an Analysis of Alternatives (AoA) to evaluate alternative design concepts for the LX(R). Concepts evaluated included

- the existing LPD-17 design (which apparently was included primarily as a baseline or reference design for helping the Navy to evaluate other LX(R) design concepts, because the Navy considered the existing LPD-17 design to be unaffordable for the purposes of the LX(R) program);[15]

[12] The amount of AP funding originally provided for the LX(R) program by Congress in FY2016 was $250 million. By the time of the FY2017 funding realignment, $236 million of this sum remained available for realignment.

[13] Source: Navy briefing on LX(R) program to CRS and Congressional Budget Office (CBO), July 26, 2017.

[14] Source: Navy briefing on LX(R) program to CRS and CBO, March 23, 2015.

[15] A May 29, 2014, press report quotes Vice Admiral William Hilarides, the Commander of the Naval Sea Systems Command (NAVSEA), as stating, in connection with the AoA, that "an LPD-17 variant that's built exactly like the current LPD-17 is off the table. It is unaffordable in the context of the ship we need to replace." (As quoted in Sam (continued...)

- a modified (reduced capability/reduced-cost) version of the LPD-17 design;
- brand new (i.e., "clean-sheet") designs; and
- foreign designs.

A June 1, 2014, press report stated that the Navy, as part of the AoA, considered incorporating commercial-ship components into the LX(R) design as a means of helping to minimize the ship's procurement cost.[16] The Navy used the results of the AoA to inform its decision on a preferred design solution for the LX(R).

HII, the builder of LPD-17 class ships, promoted a modified LPD-17 as the design solution for the LX(R) program, citing the capabilities of the LPD-17 hull design, the reduced up-front design costs of modifying an existing design compared to those of developing an entirely new design, and the potential benefits in terms of life-cycle operation and support (O&S) costs of building the LX(R) to a design that uses the same basic hull and many of the same components as the LPD-17 design. Marine Corps leaders, citing their satisfaction with the LPD-17 design, expressed support for a modified LPD-17 design as the design solution for the LX(R) program.[17] Other observers, noting that the LPD-17, with a full load displacement of about 25,000 tons, is considerably larger than the LSD-41/49 class ships, questioned whether a modified LPD-17 could meet the Navy's reported unit procurement cost target for the LX(R) program.

Design Based on LPD-17

An October 20, 2014, press report stated that Secretary of the Navy Ray Mabus had signed a decision memorandum dated October 14, 2014, designating a design based on LPD-17 design as the Navy's preferred alternative for the design of the LX(R).[18] A November 5, 2015, press report states:

> The Navy and Marine Corps were able to design an LX(R) dock landing ship replacement with greater capability for less money by starting with the higher-end San

(...continued)

LaGrone, "NAVSEA: Affordability Prompted Second Look at LX(R)," *USNI News* (http://news.usni.org), May 29, 2014. The same quote (without the final two words) appears in Kris Osborn, "Navy Considers Commercial Technology for New Amphib," *DOD Buzz* (http://www.dodbuzz.com/), June 1, 2014.

[16] Kris Osborn, "Navy Considers Commercial Technology for New Amphib," *DOD Buzz* (http://www.dodbuzz.com/), June 1, 2014.

[17] A group of 20 Marine Corps generals expressed support for the LPD-17 hull form as the design solution for the LX(R) program in a letter to the Senate Armed Services Committee dated March 25, 2014. See Lara Seligman, "Officials On LX(R): LPD-17 Design Is Best Fit For Marine Lift Requirements," *Inside the Navy*, April 7, 2014. See also Megan Eckstein, "Amos: LPD Hull Production Should Continue, Serve As LSD Replacement," *Inside the Navy*, April 15, 2013.

[18] According to the press report, the decision memorandum had been previously signed by Admiral Jonathan Greenert, the Chief of Naval Operations (CNO), General Joseph Dunford, Commandant of the Marine Corps, General James Amos, former Commandant of the Marine Corps, and Sean Stackley, Assistant Secretary of the Navy for Research, Development and Acquisition. According to the press report, the decision memorandum stated that preliminary design efforts for the LX(R) would begin "immediately." (Lara Seligman, "Mabus Signs Decision Memo: LPD-17 Variant Preferred Platform For LX(R)," *Inside the Navy*, October 20, 2014. See also Sam LaGrone, "Memo: Hull Based On San Antonio Design Is Navy's Preferred Option For Next Generation Amphib," *USNI News*, October 20, 2014; Lara Seligman, "Senior Navy Officials Tell Mabus LPD-17 Variant Is Best Option For LX(R)," *Inside the Navy*, October 13, 2014; Lara Seligman, "Senior Leadership Get Decision Brief On LX(R); MOA Expected This Month," *Inside the Navy*, October 6, 2014; Lara Seligman, "Navy Moving Forward With 'Paper Review' Of LX(R) Amphibious Program," *Inside the Navy*, September 22, 1014; Lara Seligman, "Navy: LX(R) Will Either Be Modified LPD-17 Or 'Completely New' Design," *Inside the Navy*, August 18, 2014.)

> Antonio-class LPD-17 design, stripping away unneeded features and adding back in desired ones, service officials said last week.
>
> [Capt. Bryon Johnson, head of the amphibious warfare branch in the expeditionary warfare directorate (OPNAV N953), said that] By starting with an existing ship design and avoiding the extensive engineering cost of beginning with a clean sheet, the Navy saved "enough cost that we were actually able to take that money… and reinvest it into the platform" in the form of additional capabilities today's LSDs don't have, such as command and control to support split and disaggregated operations.
>
> Johnson said the program had to stay within a cost cap but said he was confident the first ship would stay within the cost cap and deliver on time.
>
> Lt. Gen. Robert Walsh, who served as director of expeditionary warfare (OPNAV N95) until July, said at a Marine Corps Association event last month that, in fact, the Navy and Marine Corps had far surpassed cost-reduction goals while descoping the LPD design.
>
> "We drove that to a cost cap that was given to us by [the chief of naval operations], and we, with our industry partners, with [Naval Sea Systems Command], drove in the right requirements. And we got the most we could possibly get out of that ship, and it almost looks like an LPD-17, and we got it well under the cost cap," he said.
>
> Current N95 Maj. Gen. Chris Owens said the approach is "attractive to [the Office of the Secretary of Defense] and it's attractive on Capitol Hill" due to its efficiency. Ultimately, he said, it will "give us a bigger ship, greater capability, not only in size and capacity but also in things like aviation capability, the medical capability and perhaps most importantly in this day and age of split and disaggregated operations the command and control capability that the LSDs lack. And we can only do that.[19]

Figure 2 shows an artist's rendering of the LX(R).

Contract Design Work[20]

On June 25, 2015, the Navy issued a combined solicitation consisting of separate requests for proposals (RFPs) for

- the detailed design and construction (DD&C) of the first six ships in the TAO-205 class oiler program (previously known as the TAO[X] program);[21]
- the detailed design and construction in FY2017 (and also procurement of long lead-time materials in FY2016) for an amphibious assault ship called LHA-8 that the Navy procured in FY2017; and
- contract design support for the LX(R) program.[22]

The Navy limited bidding in this combined solicitation to two bidders—Huntington Ingalls Industries' Ingalls Shipbuilding (HII/Ingalls) and General Dynamics' National Steel and

[19] Megan Eckstein, "Navy: LX(R) Will Be Cheaper, More Capable Thanks To Using San Antonio LPD Design As Starting Point," *USNI News*, November 5, 2015.

[20] Source for this section: Navy briefing on LX(R) program to CRS and CBO, March 23, 2015.

[21] The TAO-205 class program is a Navy program to procure a class of 20 new oilers. The first TAO-205 was procured in FY2016. For more on the TAO-205 class program, see CRS Report R43546, *Navy John Lewis (TAO-205) Class Oiler Shipbuilding Program: Background and Issues for Congress*, by (name redacted) .

[22] Press reports describe it as a single RFP; see, for example, Sam LaGrone, "Navy Issues RFP for Oilers and LHA-8 to NASSCO, Ingalls," *USNI News*, July 10, 2015; Valerie Insinna, "Navy Quietly Issues RFP for LHA-8, TAO(X)," *Defense Daily*, July 14, 2015: 2. Contract design work is intended to develop the design of a ship enough so that a contract can then be awarded for the detailed design of the ship.

Shipbuilding Company (GD/NASSCO)—on the grounds that these are the only two shipbuilders that have the capability to build both TAO-205s and LHA-8. Under the Navy's plan for the combined solicitation, one of these two yards was to be awarded the DD&C contract for the first six TAO-205s, the other yard was to be awarded the DD&C contract (and procurement of long lead-time materials) for LHA-8, and the shipyard with the lowest combined evaluated price was to receive a higher profit on its DD&C contract[23] and also be awarded the majority of the LX(R) contract design engineering man-hours. GD/NASSCO was awarded the first six TAO-205s; HII/Ingalls was awarded LHA-8; and HII/Ingalls and GD/NASSCO were awarded 75% and 25%, respectively, of the LX(R) contract design engineering man-hours.[24]

Figure 2. Artist's Rendering of LX(R)

Source: HII rendering accessed October 25, 2017, at https://newsroom.huntingtoningalls.com/file?fid=57c494672cfac21cbb8e3eac.

Builder or Builders

The Navy has not determined which shipyard or shipyards will build LX(R)s. The Navy reportedly is open to the possibility of having the ships built at either HII/Ingalls or GD/NASSCO, or at both shipyards. The Navy plans to release the request for proposal (RFP) for the program in early FY2019 and award the detailed design and construction (DD&C) and long leadtime materials (LLTM) contract for the program in early FY2020.

[23] The Navy is planning to employ a Profit Related to Offer (PRO) contracting approach within this combined solicitation strategy to encourage competitive pricing by the shipyards. Under PRO bidding, both bidders are granted work, but the bidder with the lower price is given a high profit margin. PRO bidding has been used in other Navy shipbuilding programs, particularly the DDG-51 destroyer program, where it has been used since the 1990s.

[24] Regarding the division of the LX(R) contract design engineering man-hours, see Lee Hudson, "Ingalls Awarded Three Times More Hours for LX(R) Design Than NASSCO," *Inside the Navy*, July 8, 2016.

Potential Block Buy Contract

The Navy reportedly hopes to use a type of multiyear contract known as a block buy contract to procure the first few LX(R)s.[25] In September 2016, the Marine Corps testified that using a block buy contract could permit the Navy to procure five LX(R)s at the price of three and a half LX(R)s procured separately—an implied cost reduction of 30%,[26] which would go well beyond the reduction of 5% to 10% that might normally be expected for a block buy contract for a group of five Navy ships.

12th and 13th LPD-17 Class Ships

Although the Navy, consistent with the previous 33-ship (11+11+11) amphibious ship force-level goal, had wanted LPD-27, the 11th LPD-17 class ship, to be the final ship in the LPD-17 program, Congress funded the procurement of a 12th LPD-17 class ship (i.e., LPD-28) in FY2016.[27] As mentioned earlier, consistent with that action, the Navy modified its force-level goal for amphibious ships to a 34-ship (11+12+11) goal.[28]

As also mentioned earlier, this 34-ship goal was then superseded by the Navy's new 38-ship (12+13+13) force-level goal for amphibious ships. Consistent with this new goal, Congress funded the procurement of a 13th LPD-17 class ship (i.e., LPD-29) in FY2017.

LPD-28's estimated procurement cost of $1,793.0 million is $286.2 million less than that of the 11th LPD-17 class ship, which was procured in FY2012 and has an estimated procurement cost of $2,079.2 million. The Navy states that it plans to achieve LPD-28's lower estimated procurement cost by incorporating design innovations and cost-reduction strategies intended for the LX(R).[29] This will make LPD-28 a transitional ship between the baseline LPD-17 design and the LX(R) design.

LPD-29's estimated procurement cost is $1,786.0 million. The Navy states that LPD-29 will incorporate about eight more design changes than LPD-28, and that the additional design changes are to improve ship affordability and incorporate fact-of-life changes.[30]

Figure 3 shows an artist's rendering of LPD-29.

[25] Justin Doubleday, "Navy Open to Both Shipyards Building New LX(R) Amphibious Ships, *Inside the Navy*, January 27, 2017. For more on block buy contracts, see CRS Report R41909, *Multiyear Procurement (MYP) and Block Buy Contracting in Defense Acquisition: Background and Issues for Congress*, by (name redacted) and (name redacted) .

[26] See Lee Hudson, "Neller Reveals Dock Landing Ship Replacement Block-Buy Cost Savings," *Inside the Navy*, September 19, 2016.

[27] Congress provided $263.3 million in unrequested advance procurement (AP) funding for a 12th LPD-17 class ship in FY2013 (this funding figure was later reduced to $243.0 million by the sequester of March 1, 2013), an additional $1.0 billion in unrequested procurement funding for a 12th LPD-17 class ship in FY2015, and the final $550 million in procurement funding needed to complete the procurement cost of the ship in FY2016. (In response to Congress's FY2013 and FY2015 funding actions, the Navy, as a part of its FY2016 budget submission, inserted a 12th LPD-17 class ship into its shipbuilding program and requested the $550 million needed to complete the ship's estimated procurement cost.)

[28] See footnote 5.

[29] Lara Seligman, "Navy: To Stay Under $1.8 Billion, LPD-28 Will Exploit LX(R) Development Efforts," *Inside the Navy*, February 16, 2015; and Megan Eckstein, "Marines Will Use LPD-28 to Begin Transitioning to LX(R) Ship Systems," *Defense Daily*, February 4, 2015: 3-4.

[30] Source: Navy briefing on LPD-17 program to CRS and CBO, July 26, 2017.

Figure 3. Artist's Rendering of LPD-29

Source: HII image accessed October 25, 2017, at https://newsroom.huntingtoningalls.com/file?fid=595654102cfac21a4479c961. A similar rendering if LPD-28 was posted at https://newsroom.huntingtoningalls.com/file?fid=585406ac2cfac20df6c2ebaf.

Issues for Congress for FY2018

FY2018 LX(R) Program Funding

One issue for Congress for FY2018 is whether to approve, reject, or modify the Navy's FY2018 funding requests for the LX(R) program, including whether to provide funding intended to accelerate the procurement of the first LX(R) to FY2019.

Option of Funding Procurement of 14th LPD-17 Class Ship in FY2018

Another issue for Congress is whether to provide funding for the procurement in FY2018 of a 14th LPD-17 class ship (which would be designated LPD-30). Supporters could argue that it would accelerate the attainment of the Navy's desired 38-ship amphibious force and further close the gap between the end of LPD-17 procurement and the start of LX(R) procurement, which could help reduce LX(R) unit costs if HII/Ingalls is eventually selected as the builder of the first LX(R). Skeptics or opponents could argue that the Navy's 38-ship (12+13+13) force-level goal for amphibious ships includes 13 LPD-17 class ships, not 14; that providing funding for the procurement of a 14th LPD-17 class ship could reduce funding available for other (and possibly higher-priority) Navy or DOD programs; and that further closing the gap between the end of LPD-17 procurement and the start of LX(R) procurement would be of uncertain value because the builder of the first LX(R) has not been selected and it is not certain that HII/Ingalls will be the builder.

An October 30, 2017, press report states:

> The Navy's San Antonio class of vessels will end with LPD-29 because the service needs the dock landing ship replacement, known as LX(R), to conduct distributed operations, according to a service official.
>
> Capt. Dave Bossert, amphibious warfare branch head in the office of the chief of naval operations expeditionary warfare office (N953), told Inside the Navy here Oct. 26 the service determined it needed 13 LPDs in its inventory.
>
> "We're tying a bow on the LPD-17 class; that's how many we need," he said. "Yes, there's plenty more demand but through our analysis it's really trying to maintain objectivity within the fiscal constraints that is the last [LPD-29]."[31]

LX(R) Design

Another potential issue for Congress for FY2018 is whether LX(R)s should be built to the Navy's currently planned LX(R) design, or to a more expensive and (in some ways) more capable design that is closer to that of the LPD-17 design. In assessing this issue, Congress may consider various factors, including the potential production and life-cycle operation and support (O&S) benefits of making the LX(R) design more similar to that of the LPD-17 design, the potential operational benefits of making the LX(R) design more capable, constraints on Navy funding, competing Navy program priorities, and the resulting potential net effect on Navy capabilities.

Legislative Activity for FY2018

Summary of Congressional Action on FY2018 Funding Request

Table 2 summarizes congressional action on the Navy's FY2018 funding request for the LX(R) and LPD-17 programs.

Table 2. Summary of Congressional Action on FY2018 Funding Request

Millions of dollars, rounded to nearest tenth

		Authorization			Appropriation		
	Request	HASC	SASC	Conf.	HAC	SAC	Conf.
Procurement funding for LX(R)	0	0	0	0	0	.0	
Advance procurement (AP) funding for LX(R)	0	100.0	0	0	0	0	
Procurement funding for LPD-17	0	1,786.0	0	0	0	0	
Procurement funding for either LX(R) or LPD-17	0		1,000.0	1,500.0	0	1,000.0	
Research and development—PE 0604454N, LX(R), line 86	9.6	9.6	9.6	9.6	9.6	9.6	

Source: Table prepared by CRS based on Navy's FY2018 budget submission, committee and conference reports, and explanatory statements on FY2018 National Defense Authorization Act and FY2018 DOD Appropriations Act.

Notes: 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 agreement.

[31] Lee Hudson, "Navy Needs Dock Landing Ship Replacement for Distributed Operations," *Inside the Navy*, October 30, 2017.

FY2018 National Defense Authorization Act (H.R. 2810/S. 1519)

House

The House Armed Services Committee, in its report (H.Rept. 115-200 of July 6, 2017) on H.R. 2810, recommended the funding levels for the LX(R) and LPD-17 programs shown in the HASC column of **Table 2**.

Senate

The Senate Armed Services Committee, in its report (S.Rept. 115-125 of July 10, 2017) on S. 1519, recommended the funding levels for the LX(R) and LPD-17 programs shown in the SASC column of **Table 2**.

Section 124 of S. 1519 as reported states:

> SEC. 124. Design and construction of amphibious ship replacement designated LX(R) or amphibious transport dock designated LPD–30.
>
> (a) In general.—The Secretary of the Navy may enter into a contract, beginning with the fiscal year 2018 program year, for the design and construction of the amphibious ship replacement designated LX(R) or the amphibious transport dock designated LPD–30 using amounts authorized to be appropriated for the Department of Defense for Shipbuilding and Conversion, Navy.
>
> (b) Use of incremental funding.—With respect to the contract entered into under subsection (a), the Secretary may use incremental funding to make payments under the contract.
>
> (c) Condition for out-year contract payments.—The contract entered into under subsection (a) shall provide that any obligation of the United States to make a payment under such contract for any fiscal year after fiscal year 2018 is subject to the availability of appropriations for that purpose for such fiscal year.

Regarding Section 124, S.Rept. 115-125 states:

> **Design and construction of amphibious ship replacement designated LX(R) or amphibious transport dock designated LPD–30 (sec. 124)**
>
> The committee recommends a provision that would authorize the Secretary of the Navy to enter into and incrementally fund a contract for design and construction of the amphibious ship replacement designated LX(R) or the amphibious transport dock designated LPD–30.
>
> The committee notes that the Secretary of the Navy, the Chief of Naval Operations, and the Commandant of the Marine Corps support the LX(R) as a derivative of the San Antonio-class (LPD–17) hull form. The committee further notes the latest "Navy Force Structure Assessment," which was published in December 2016, increased the requirement for amphibious ships from 34 to 38. (Page 8)

S.Rept. 115-125 also states:

> **Amphibious ship replacement LX(R) or amphibious transport dock designated LPD–30**
>
> The budget request included no funding in line items 12 or 13 for procurement or advance procurement associated with the amphibious ship replacement LX(R) or amphibious transport dock designated LPD–30.

> The committee notes that the Secretary of the Navy, the Chief of Naval Operations, and the Commandant of the Marine Corps support the LX(R) as a derivative of the San Antonio-class (LPD–17) hull form. The committee further notes the latest Navy Force Structure Assessment, which was published in December 2016, increased the requirement for amphibious ships from 34 to 38.
>
> Therefore, the committee recommends an increase of $1.0 billion for construction of either an amphibious ship replacement LX(R) or the amphibious transport dock designated LPD–30. (Page 17)

Conference

The conference report (H.Rept. 115-404 of November 9, 2017) on H.R. 2810 recommended the funding levels for the LX(R) and LPD-17 programs shown in the authorization conference column of **Table 2**.

Section 125 of the conference version of H.R. 2810 states:

> SEC. 125. Design and construction of the lead ship of the amphibious ship replacement designated LX(R) or amphibious transport dock designated LPD–30.
>
> (a) In general.—Using funds authorized to be appropriated for the Department of Defense for Shipbuilding and Conversion, Navy, the Secretary of the Navy may enter into a contract, beginning with the fiscal year 2018 program year, for the design and construction of—
>
> (1) the lead ship of the amphibious ship replacement class designated LX(R); or
>
> (2) the amphibious transport dock designated LPD–30.
>
> (b) Use of incremental funding.—With respect to the contract entered into under subsection (a), the Secretary may use incremental funding to make payments under the contract.
>
> (c) Condition for out-year contract payments.—The contract entered into under subsection (a) shall provide that any obligation of the United States to make a payment under such contract for any fiscal year after fiscal year 2018 is subject to the availability of appropriations for that purpose for such later fiscal year.

Regarding Section 125, H.Rept. 115-404 states:

> *Design and construction of the lead ship of the amphibious ship replacement designated LX(R) or amphibious transport dock designated LPD–30 (sec. 125)*
>
> The Senate amendment contained a provision (sec. 124) that would authorize the Secretary of the Navy to enter into and incrementally fund a contract for design and construction of the amphibious ship replacement designated LX(R) or the amphibious transport dock designated LPD–30.
>
> The House bill contained no similar provision.
>
> The House recedes with a technical amendment. (Page 767)

FY2018 DOD Appropriations Act (Division A of H.R. 3219/S.XXXX)

House

H.R. 3219 as reported by the House Appropriations Committee (H.Rept. 115-219 of July 13, 2017) was the FY2018 DOD Appropriations Act. H.R. 3219 as passed by the House is called the Make America Secure Appropriations Act, 2018. H.R. 3219 as passed by the House includes the

FY2018 DOD Appropriations Act as Division A and four other appropriations acts as Divisions B through E. The discussion below relates to Division A.

The House Appropriations Committee, in its report (H.Rept. 115-219 of July 13, 2017) on H.R. 3219, recommended the funding levels for the LX(R) and LPD-17 programs shown in the HAC column of **Table 2**.

Senate

On November 21, 2017, the Senate Appropriations Committee released a Chairman's recommendation and explanatory statement for the FY2018 DOD Appropriations Act, referred to here as S. XXXX. The explanatory statement recommended the funding levels shown in the SAC column of **Table 2**. The recommended increase of $1,000 million (i.e., $1 billion) in procurement funding is for "Program increase: Incremental funding for LX-R or LPD-30." (Page 106)

Author Contact Information

(name redacted)
Specialist in Naval Affairs
[redacted]@crs.loc.gov, 7-....