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November 4, 2020

Navy Large Surface Combatant (LSC) Program: Background and Issues for Congress

Introduction

The Navy's Large Surface Combatant (LSC) program envisages procuring a class of next-generation cruisers or destroyers to replace the Navy's aging Ticonderoga (CG-47) class Aegis cruisers. The Navy wants to procure the first LSC around FY2028, although that date could change. The Navy's proposed FY2021 budget requests $46.5 million in research and development (R&D) funding for the LSC program in one R&D line item and some additional funding for the program in another R&D line item.

The issue for Congress is whether to approve, reject, or modify the Navy's FY2021 funding request and emerging acquisition strategy for the program. Congress's decisions on this issue could affect future Navy capabilities and funding requirements and the U.S. shipbuilding industrial base.

Terminology

Decades ago, the Navy's cruisers were considerably larger and more capable than its destroyers. In the years after World War II, however, the Navy's cruiser designs in general became smaller while its destroyer designs in general became larger. As a result, since the 1980s there has been substantial overlap in size and capability of Navy cruisers and destroyers. The Navy's new Zumwalt (DDG-1000) class destroyers, in fact, are considerably larger than the Navy's cruisers.

In part for this reason, the Navy now refers to its cruisers and destroyers collectively as *large surface combatants* (LSCs), and distinguishes these ships from the Navy's *small surface combatants* (SSCs), the term the Navy now uses to refer collectively to its frigates, Littoral Combat Ships (LCSs), mine warfare ships, and patrol craft.

Surface Combatant Industrial Base

All LSCs procured for the Navy since FY1985 have been built at General Dynamics/Bath Iron Works (GD/BIW) of Bath, ME, and Huntington Ingalls Industries/Ingalls Shipbuilding (HII/Ingalls) of Pascagoula, MS. Lockheed Martin and Raytheon are major contractors for Navy surface ship combat system equipment. The surface combatant base also includes hundreds of additional component and material supplier firms.

Existing CG-47 Class Aegis Cruisers

The Navy procured a total of 27 Ticonderoga (CG-47) class cruisers (one of which is shown in **Figure 1**) between FY1978 and FY1988. The ships entered service between 1983 and 1994. They are commonly called Aegis cruisers because they are equipped with the Aegis combat system, an integrated collection of sensors and weapons named for the mythical shield that defended Zeus. The first five ships in the class, which were built to an earlier technical standard, were judged by the Navy to be too expensive to modernize and were removed from service in 2004-2005, leaving the current force of 22 ships. The Navy's FY2020 30-year shipbuilding plan projected that these 22 ships would reach the ends of their service lives and be retired between FY2021 and FY2038.

Figure 1. Existing CG-47 Class Aegis Cruiser

USS *Antietam* (CG-54), commissioned in 1987

Source: Cropped version of U.S. Navy photograph.

LSC Program

Navy's General Concept for the Ship

Navy officials have spoken on and off for years about a new ship to replace the aging Aegis cruisers. The Navy's concept for the new ship has evolved over that time. The Navy currently envisages the LSC as a ship with a new hull design that would initially be equipped with combat system equipment similar to that installed on the Flight III version of the Arleigh Burke (DDG-51) class destroyer—a type of ship that the Navy is currently procuring. (For more on the DDG-51 program, see CRS Report RL32109, *Navy DDG-51 and DDG-1000 Destroyer Programs: Background and Issues for Congress*, by Ronald O'Rourke.)

Navy officials have stated that they envision the LSC as being larger than the DDG-51 Flight III design, which has a full load displacement of about 9,700 tons, but smaller than the Navy's DDG-1000 class destroyers, which have a full load displacement of about 15,700 tons. The mid-point between those two figures is 12,700 tons, though the LSC as designed could have a displacement higher or lower than that. The Navy states that the LSC would

> initially integrate non-developmental systems into a new hull design that incorporates platform flexibility and growth capabilities to meet projected future fleet system requirements. Initial LSCs will

leverage DDG 51 Flight III combat systems as well as increased flexibility/adaptability features including expanded Space, Weight, Power & Cooling, Service Life Allowances (SWaP-C SLA) to allow for more rapid and affordable upgrades in capabilities over the ships' service life and allow for fielding of future high-demand electric weapons and sensor systems and computing resources. Additional capabilities of interest that will be evaluated for the initial ship include the ability of the ship's Vertical Launch System [VLS] to accommodate longer and larger-diameter missiles for increased speed and range of weapons, additional capacity for an embarked warfare commander and staff, support for 360-degree coverage with directed-energy weapons, and improved signatures with support for additional improvements over time. The new ships will be designed to provide these initial capability increases as well as the growth capacity to support projected future systems requirements. The design will also incorporate flexibility features to quickly back-fit and forward-fit systems to pace known threats and meet future emergent needs through evolutionary block upgrades and modernization.

(Source: *Department of Defense Fiscal Year (FY) 2021 Budget Estimates, Navy, Justification Book, Volume 2 of 5, Research, Development, Test & Evaluation, Navy*, February 2020, p. 518; includes some minor typographic edits by CRS for readability.)

Procurement Date for Lead Ship

As mentioned earlier, the Navy wants to procure the first LSC around FY2028, though the date for procuring the first ship has changed before and could change again. Procurement of DDG-51 Flight III destroyers would end at about the time that procurement of LSCs would begin. The Navy's FY2021 budget submission suggests that the final DDG-51 Flight III ship would be procured around FY2027.

Potential Procurement Quantities

The Navy has not specified the total number of LSCs that it wants to procure. Procuring a total of 8 to 11 would provide 1 LSC for each of the 8 to 11 large aircraft carriers that the Navy reportedly would aim to have in the future, under a plan called Battle Force 2045 that Secretary of Defense Mark Esper announced in October 2020. (For more on the Battle Force 2045 plan, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.) Procuring a total of 22 would provide one-for-one replacements for each of the current 22 Aegis cruisers. Keeping the design in production so as to additionally replace at least some of the Navy's older DDG-51s as those ships start to retire in the 2030s could result in a larger total procurement quantity. Numbers such as these, as well as the Navy's FY2020 30-year shipbuilding plan, suggest a potential LSC annual procurement rate of one to two ships per year.

Potential Unit Procurement Cost

Ships of the same general type (in this case, large surface combatants) tend to have unit procurement costs roughly proportional to their displacements. An LSC displacing about 12,700 tons would have a displacement roughly 30% greater than that of the DDG-51 Flight III design. The DDG-51 Flight III design currently has a unit procurement cost of about $1.9 billion. Increasing that figure by 30% would suggest a potential LSC unit procurement cost of roughly $2.5 billion in today's dollars, though the cost could be initially higher because the first several LSCs would be at the top of the LSC production learning curve, whereas at least some aspects of the DDG-51 Flight III design reflect design features that have been in production for many years and are thus well down the production learning curve. The first LSC, moreover, would be considerably more expensive than follow-on ships in the program, because its procurement cost would incorporate the detailed design and nonrecurring engineering (DD/NRE) costs for the class.

FY2021 Program Funding

The Navy's proposed FY2021 budget requests $46.5 million in R&D funding for the LSC program in Project 0411, Future Surface Combatant Concept, within Program Element (PE) 0603564N, Ship Preliminary Design & Feasibility Studies, which is line 46 in the Navy's FY2021 R&D account. Some additional funding supporting the LSC program is in Project 2196, Design, Tools, Plans and Concepts, within PE 0603563N, Ship Concept Advanced Design, which is line 45.

Congressional Action in FY2020

The Senate Armed Services Committee, in its report (S.Rept. 116-48 of June 11, 2019) on the FY2020 national Defense Authorization Act (S. 1790) raised questions about the program's capability requirements and technologies. Section 131 of the FY2020 National Defense Authorization Act (S. 1790/P.L. 116-92 of December 20, 2020) prohibits the LSC program from receiving Milestone B acquisition approval until certain conditions are met.

Congressional Action for FY2021

The Senate Armed Services Committee, in its report (S.Rept. 116-236 of June 24, 2020) on the FY2021 National Defense Authorization Act (S. 4049), says it lacks sufficient clarity regarding the LSC program's capability requirements and its compliance with Section 131 of P.L. 116-92. The committee recommended reducing the Navy's FY2021 funding requests for the program and directed the Navy to submit a report regarding the program's compliance with Section 131.

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