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ANSWERS TO QUESTIONS FOR THE RECORD

Following a Hearing on

The Navy's 2025 Shipbuilding Plan and Its Implications for the Shipbuilding Industrial Base

Conducted by the
Subcommittee on Seapower and Projection Forces
Committee on Armed Services
U.S. House of Representatives

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On March 11, 2025, the Subcommittee on Seapower and Projection Forces of the House Committee on Armed Services convened a hearing at which Eric J. Labs, Senior Analyst for Naval Forces and Weapons at the Congressional Budget Office, testified about the Navy's 2025 shipbuilding plan and its implications for the shipbuilding industrial base.[1] *After the hearing, Representatives Jared Golden, Clay Higgins, Eugene Vindman, and George Whitesides submitted questions for the record. This document provides CBO's answers. It is available at* www.cbo.gov/publication/61291.

Representative Golden's Question About the Discrepancy Between the Navy's and CBO's Estimates of Shipbuilding Costs

Question. CBO did a cost estimate of the construction cost of major new ships under the 2025 plan. Why is there such a discrepancy in the cost that the Navy estimates versus what CBO estimates?

Answer. CBO's and the Navy's cost estimates for new ships differ for three main reasons: CBO's and the Navy's methods for estimating costs differ; their projections of the size and complexity of future ships sometimes differ; and the Navy sometimes publishes cost estimates for new ship programs that do not fully reflect the results of the service's cost analysis.[2]

CBO's cost estimates for new ships rely heavily on data about analogous ships. To estimate the cost of a new surface combatant, for example, CBO uses data about similar ships that the Navy has acquired in the past to estimate the new ship's displacement (the weight of the water it displaces) and capabilities. The agency then determines how much similar surface combatants have cost in the past—by weight—and uses that information to develop its estimate. Similarly, if the new ship was an amphibious ship, CBO would determine the historical cost by weight of a similar amphibious ship and would treat that information as a key component of its estimate. As a general rule, new naval ships do not cost less by weight than similar ships have cost historically.

CBO then adjusts the estimated cost of the ship by factors associated with rate (the production efficiencies that are made possible when several ships of the same type are built simultaneously or in close succession at a given shipyard), learning (the gains in efficiency that accrue over the duration of a ship's production as shipyard workers gain familiarity with a particular ship model), and acquisition strategy (such as whether construction contracts are awarded as a result of a competitive process).

In the final step, CBO adjusts its estimate to account for the fact that inflation in the shipbuilding industry has been growing, and is projected to continue growing, faster than inflation in the economy as a whole. The difference between the naval shipbuilding index and economywide inflation is added to CBO's estimates to reflect real (inflation-adjusted) growth in costs.[3] That difference has a greater effect on costs of ships that are proposed for procurement many years in the future than on costs of ships that the Navy plans to purchase in the near term.

As a result of that process, in some instances, CBO makes different projections than the Navy does about the size or complexity of future ships. (CBO considers not only the Navy's plans but also how shipbuilders would probably implement those plans.) Those differing projections substantially affect estimated costs.

Two examples illustrate some of the differences between CBO's and the Navy's approaches to estimating the size and complexity of future ships. The Navy's initial cost estimate for the SSN(X), a new class of attack submarine, was slightly higher than its estimate for the Virginia class attack submarine, which was then in production. Although the Navy's shipbuilding plan did not include details about the capabilities of the SSN(X), the service's cost estimate implied that it would be only slightly more capable than the Virginia class ship. But on the basis of the Navy's description of the SSN(X)'s desired capabilities, CBO assessed that the new submarine would need to be much larger, faster, and stealthier than the Virginia class ship and would also need to carry more weapons. Thus, to develop its estimate for the SSN(X), CBO used

1. Testimony of Eric J. Labs, Senior Analyst for Naval Forces and Weapons, Congressional Budget Office, before the Subcommittee on Seapower and Projection Forces of the House Committee on Armed Services, *The Navy's 2025 Shipbuilding Plan and Its Implications for the Shipbuilding Industrial Base* (March 11, 2025), www.cbo.gov/publication/61218.

2. For an explanation of CBO's methods, see Congressional Budget Office, *How CBO Estimates the Cost of New Ships* (April 2018), www.cbo.gov/publication/53785.

3. Congressional Budget Office, *The Shipbuilding Composite Index and Its Rates of Change Compared With Economywide Inflation Rates* (April 2024), www.cbo.gov/publication/59026.

as an analogue the Seawolf class submarine, which is substantially larger and faster than the Virginia class ship and has twice the torpedo capacity. As a result, CBO's estimate of the cost for the SSN(X) was much higher than the Navy's.[4]

More recently, the Navy's cost estimate for its medium landing ship (LSM) generally relied on cost-estimating relationships for amphibious ships for about 35 percent of the weight of the LSM and for commercial or logistics ships to account for the remaining 65 percent of the weight.[5] After examining the Navy's request for proposal for the LSM and consulting with various shipbuilders and the Navy, CBO used a different approach in which the cost-estimating relationships for the LSM represented a 50/50 split between amphibious ships and commercial or logistics ships. That approach, along with other elements of CBO's analysis, resulted in a cost estimate that was two to three times higher than the Navy's. In December 2024, the Navy retracted its request for proposal for the LSM because the costs reflected in shipbuilders' bids were much higher than the service expected (and much closer to CBO's estimates).[6]

And finally, CBO's and Navy's cost estimates for new ships sometimes differ because the Navy's published estimates do not always align with the results of the service's analysis. That was true of the estimated costs for two ships included in the President's 2025 budget, the LSM and the next-generation ocean surveillance ship known as the T-AGOS(X). Specifically, the Navy's estimates of the costs for those ships from 2026 to 2029 were much lower than its estimates for identical ships in 2030 and beyond—a difference that was attributable to more than an adjustment for inflation. Navy officials told CBO and the Congressional Research Service that the cost estimates for the LSMs and T-AGOS(X)s that the service proposed to buy from 2026 to 2029 were administratively lowered to help pay for inflation in other parts of the Navy's budget and that published estimates for those ships were expected to be higher in future budget submissions.

4. Congressional Budget Office, *An Analysis of the Navy's Fiscal Year 2019 Shipbuilding Plan* (October 2018), p. 22, www.cbo.gov/publication/54564.

5. A cost-estimating relationship is a mathematical formula that describes the per-unit cost of a ship's components, materials, or performance characteristics.

6. Mallory Shelbourne, "Landing Ship Medium Program Stalled Over Price, Navy Cancels Industry RFP," *USNI News* (updated December 18, 2024), https://tinyurl.com/2rafdjjn.

Representative Higgins's Questions About the Production Schedule for Yard, Repair, Berthing, and Messing Barges (YRBMs)

Question. In March 2022 the Navy awarded a contract for the first of a new class of Yard, Repair, Berthing and Messing (YRBM) barge craft to replace the existing Navy berthing barges, some of which are of WWII vintage. Since this initial award in March 2022, to date, the Navy has awarded options for seven additional barges ahead of the original procurement schedule. In an attempt to help mitigate any break in the production line and reduce overall YRBM program costs, Congress authorized $30 million in the enacted FY 2025 NDAA and to date $30 million has been provided in the FY 2025 House and Senate Defense Appropriations bills for one additional YRBM vessel. The FY 2024 Navy budget justifications submitted to Congress in early 2023 also stated that at least one YRBM vessel would be requested in FY 2025 as well as one per year from FY 2026 through FY 2028. However, the Navy's FY 2025 budget request changed the FY 2024 projected procurement schedule and did not include even one YRBM barge craft for FY 2025. The FY 2025 Navy budget justifications submitted to Congress in March 2024 projected the procurement of one additional YRBM vessel in FY 2026 and possibly two vessels in FY 2027 but none again until FY 2029. In an attempt to help mitigate any break in the production line and reduce overall YRBM program costs, Congress authorized $30 million in the enacted FY 2025 NDAA and to date $30 million has been provided in the FY 2025 House and Senate Defense Appropriations bills for one additional YRBM vessel.

Would you agree that a break in the production line will significantly increase future YRBM vessel material, labor, and production costs, at an estimated 15 percent to 20 percent of the follow-on lead ship cost? To avoid a break in the production line of these sorely needed quality of life vessels for our Navy personnel, what is the required number of new YRBMs that should be funded in each of the next 5 fiscal years beginning with FY 2026?

Answer. CBO has not analyzed the YRBM program. But as a general principle, that program could take advantage of the effects of learning and rate, which can reduce the cost of producing ships. Learning refers to the efficiencies that shipyards gain as they produce additional ships of a given type; rate is the reduction in average overhead costs per ship that occurs as a shipyard builds multiple ships of the same type simultaneously. Overall, if the goal was to

purchase 5 to 10 ships over the next five years, a steady production rate of 1 YRBM or 2 YRBMs per year would provide the best opportunity to reduce costs by reaping the benefits of learning and, in the latter case, rate.

To maximize the potential for learning, the Navy could buy YRBMs at a steady rate. Ensuring a steady production rate is one of the most effective ways to reduce the unit costs of individual ships or platforms because doing so allows a shipyard to sequence its work in the most efficient way. Thus, the second ship in a production run would cost less than the first; the fifth ship would be less expensive than the second, and the ninth ship would cost even less than the fifth. A break in the production of, say, one year would reduce but not eliminate the learning that would occur with subsequent ships. However, a long break in production, such as four or five years, would eliminate the learning that occurred with earlier ships. The reduction in cost that comes from learning tapers off as more ships are built, until the benefit of learning becomes effectively exhausted.

The unit cost of YRBMs could also be reduced if more than one vessel per year was built, thus taking advantage of the rate factor. When more than one ship of the same type is built in a year, the cost per ship is less than it would be for a single ship—as long as the shipyard's production facilities and workforce can accommodate the larger volume of work.

Representative Vindman's Question About Determining Future Quantities and Costs of Unmanned Systems

Question. In your testimony you state that the 2025 shipbuilding plan does not include any estimated costs for the 134 unmanned vessels the Navy hopes to add to the fleet. Given the pace of technological developments and the lessons learned from fielding of unmanned vehicles in the Red and Black Seas, how can the Navy identify future quantities of vessels and costs associated to ensure timely development and procurement of such vehicles into the fleet?

Answer. This question involves assessing specific military objectives that are beyond the scope of CBO's analysis of the Navy's shipbuilding plan. However, as a general approach, the Navy would need to determine how unmanned systems would be used in its vision of future naval warfare—what is known as developing a concept of operations. Through comparative analysis, operations research, and wargaming techniques, the Navy may be able to determine the types, quantities, and capabilities of unmanned systems that it deems necessary to implement such a concept of operations. With sufficient information, costs of unmanned systems could then be estimated on the basis of that analysis. It is not possible to estimate the costs without knowing the quantities and types of unmanned systems the Navy plans to buy.

Representative Whitesides's Question About Measuring the Health of the Shipbuilding Industrial Base

Question. What are the top three metrics Congress should use to measure whether the Navy and the U.S. shipbuilding industrial base are making progress on key factors for progress in the shipbuilding base? Examples: Change per year in completed ships; retention rate of workers; average wage of production workers; number of U.S. ship designers; how many sites are currently building ships in the United States.

Answer. The Congress could measure the health of the shipbuilding industrial base in many ways. Some key metrics are the production rate of Virginia class submarines, the attrition rate of shipyard workers, the overall rate of ship deliveries, and the time it takes to build the ships that the Congress has authorized and appropriated funds for.

Because investment in the submarine industrial base has been large in relation to investment in other types of ships, the average production rate for Virginia class attack submarines is an important metric of the health of the shipbuilding industrial base. The Congress has authorized and appropriated funds to build two Virginia class submarines each year between 2011 and 2024. But the shipyards have produced an average of 1.2 Virginia class submarines per year for the past three years and have not achieved a rate of 2.0 submarines per year since 2011, when the Congress began appropriating funds for two such submarines per year. A steady increase in the production rate of Virginia class submarines would indicate that the overall capacity of the submarine industrial base was expanding.

A second key metric is the attrition rate of shipyard workers. Several shipyards have experienced attrition rates of about 20 percent in their total manufacturing labor force and about 30 percent for some critical trades. According to CBO's conversations with representatives from the shipyards over the past several years, reducing the attrition rate for the manufacturing labor force to around 10 percent (or less) would be a meaningful step

toward overcoming the workforce-related challenges that the shipyards are facing. Ship production would then be expected to become more efficient, the number of labor hours needed to build a given class of ship would be expected to decline as more ships were built, and construction schedules for those same ships would be expected to be shorter.

A third key metric is the overall number of ships that the shipyards deliver to the Navy. The Navy's 2025 shipbuilding plan anticipates that ship deliveries will increase from an average of about 10 ships per year in 2024 and 2025 to an average of 14 ships per year in 2030 and 17 ships per year by the mid-2030s. The Congress could track ship deliveries to determine whether they are following the Navy's plan.

Closely related to the third metric is a fourth: the amount of time taken to build specific classes of warships. As indicated in testimony, construction times for major shipbuilding programs are longer than they have been in decades: Submarines, destroyers, and amphibious assault ships under construction today are taking nine years to deliver to the Navy, compared with five or six years in the 2000s. A reduction in the amount of time needed to build those ships would indicate improvement in the shipyards' performance.