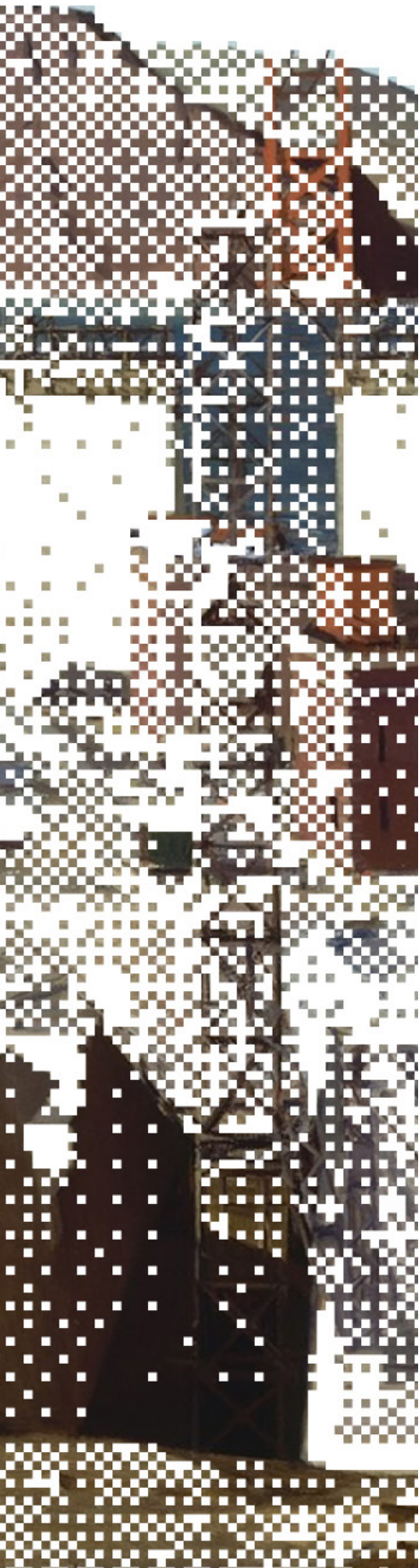




■ National Security

Reforming Naval Shipbuilding

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SUMMARY

The US Navy persistently sees ship construction delays and cost overruns. Over 80 percent of ships exceed initial budgets, and all recent lead ships delivered behind schedule. We propose three interconnected reforms to address these issues: simplifying ship designs to focus on core capabilities, rebuilding the Navy's in-house design capabilities, and ensuring designs are completed before construction begins. These changes would enable faster ship delivery, reduce costs, and maintain fleet capabilities while increasing hull count—all without requiring substantially more resources.

PROBLEM

The Navy's shipbuilding program is plagued by systematic cost overruns and schedule delays that hamper fleet modernization and capability. According to a 2018 Government Accountability Office (GAO) report, more than 80 percent of ships exceed their budgets, sometimes by 100 percent or more, while every recent lead ship has been delivered years behind schedule. These issues stem from overcomplexity in de-

sign, outsourced design capabilities, and concurrent design-build processes. The Navy creates high-level requirements for complex, multi-role ships, and it outsources the design of these ships to third-party contractors.

Once a design is selected, it is then turned into production drawings (a so-called detail design), which are used to produce the ships. In an effort to reduce the time it takes to deliver a ship, ship construction is often started before ship design is complete. However, this strategy frequently backfires: as design work is completed, changes to under-construction ships are often required, resulting in costly and time-consuming rework.

For an example, see the Constellation-class frigate, a guided missile frigate currently under development. Unlike earlier frigates (such as the Oliver Perry-class), which were designed for narrower roles, the Constellation is designed to fulfill multiple roles, including “air warfare, surface warfare, antisubmarine warfare, and electromagnetic warfare operations.” The contract for the Constellation-class was awarded to Fincantieri Marinette Marine (FMM), based on a parent design for a European FREMM frigate. However, the Navy and FMM struggled to turn the Navy’s extensive list of specifications into a completed design. Contrary to best practices, the construction of the lead ship began before the design of the ship was finalized in an attempt to avoid schedule delays, and design continued for years after construction began. This strategy has backfired: the program is now significantly over budget and three years behind schedule.

Without reform, the Navy will continue to receive fewer ships, later than needed, at higher costs than budgeted, directly hurting national security capabilities.

SOLUTION

We propose three interconnected changes to naval shipbuilding that would fundamentally transform how the Navy designs and acquires new vessels. These changes work together to create a more efficient, predictable, and cost-effective shipbuilding process.

First, the Navy should return to simpler, more focused ship designs. Current vessel designs attempt to pack multiple missions into single platforms, resulting in compromises that reduce effectiveness while increasing complexity and cost. For example, the Littoral Combat Ship’s attempt to fulfill multiple roles through modular mission packages proved unworkable, while the Ford-class carriers incorporate expensive radar systems that duplicate destroyer capabilities without clear operational benefit. Instead, ships should be optimized for specific primary missions, with clear priorities and minimal feature creep. This approach allows for faster design cycles, more efficient production, and ultimately better-performing vessels.

Second, rebuilding the Navy’s in-house design capabilities at Naval Sea Systems Command (NAVSEA) is crucial for controlling both costs and outcomes. The current practice for ship design is for the Navy to specify high-level ship requirements, and for third-party contractors to use those requirements to create the design of the ship. With the Littoral Combat Ship, for instance, both General Dynamics and Lockheed each created distinct ship designs based on the Navy’s high-level requirements for the

ship. This practice of outsourcing design work creates barriers between those setting requirements and those creating designs, and makes it difficult to both determine requirements and to modify them as cost and capability knowledge evolve during the design process. It also makes it difficult to maintain the pool of shipbuilding expertise necessary to produce quality designs, since commercial shipbuilders typically can't afford to keep a large design staff employed full-time. By bringing design back in-house, the Navy can better evaluate tradeoffs, respond to changing needs, and maintain the deep expertise needed for successful naval architecture. This change would also allow for faster iteration and more efficient communication between designers and end-users.

Third, the Navy must adopt commercial best practices by completing its designs before beginning construction. Our concurrent design-build practices, while intended to speed delivery, actually result in costly changes and delays when inevitable design modifications must be made to partially-built ships. Waiting for design maturity before starting construction ultimately results in faster delivery of better ships at lower cost.

These three changes reinforce each other—simpler ships are easier to design, in-house design teams can better focus on core requirements, and completed designs enable smoother construction. Together, they would enable the Navy to deliver more capable ships, on time, and on budget.

Executive

- Naval Sea Systems Command (NAVSEA) should rebuild in-house naval architecture and ship design capabilities by increasing naval architect staffing from current 300 to the historical level of more than 1,200. It should also implement strict design completion requirements before authorizing construction.
- The Office of the Secretary of Defense should revise the ship requirements process to emphasize focused, single-role platforms over multi-role vessels. It should establish clear guidance prioritizing design simplicity and production efficiency. And it can and should mandate substantial design completion before construction is authorized.

Congressional

- The House and Senate Armed Services Committees should authorize increased funding for NAVSEA's ship design capabilities. They should propose modified acquisition regulations to require demonstrated design maturity before construction, and they should establish oversight mechanisms for those design completion requirements.
- The House and Senate Appropriations Committees should fund an expansion of NAVSEA's naval architecture staff, and in return should require progress reports on design completion before releasing construction funds.

JUSTIFICATION

The Navy’s historical success with focused ship designs like the Perry-class frigate, the original Burke-class destroyer, and the T-AGOS-19 surveillance ship demonstrates the effectiveness of simpler, specialized vessels. The proposed return to in-house design reflects proven past practice: before the post-Cold War downsizing, NAVSEA successfully designed most Navy vessels internally. It also reflects best practices in other domains of large, government-funded, semi-unique construction projects, such as mass transit and high-speed rail construction. Commercial shipbuilding already follows the principle of completing design before construction, achieving better cost and schedule performance. These reforms build on demonstrated successful practices while addressing the specific challenges of modern naval construction. ■

FURTHER RESOURCES

- Government Accountability Office, “Navy Shipbuilding: Past Performance Provides Valuable Lessons for Future Investments,” 2018
- Robert G. Keane, Barry F. Tibbitts, and Peter E. Jacquith, “The Navy’s Ship Design Factory: NAVSEA—The ‘Golden Goose,’” *Naval Engineers Journal*, 2019
- Ronald O’Rourke, “Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress,” Congressional Research Service, 2024

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