



Highlights of GAO-24-105503, a report to congressional committees

May 2024

Navy Shipbuilding

Increased Use of Leading Design Practices Could Improve Timeliness of Deliveries

Why This Matters

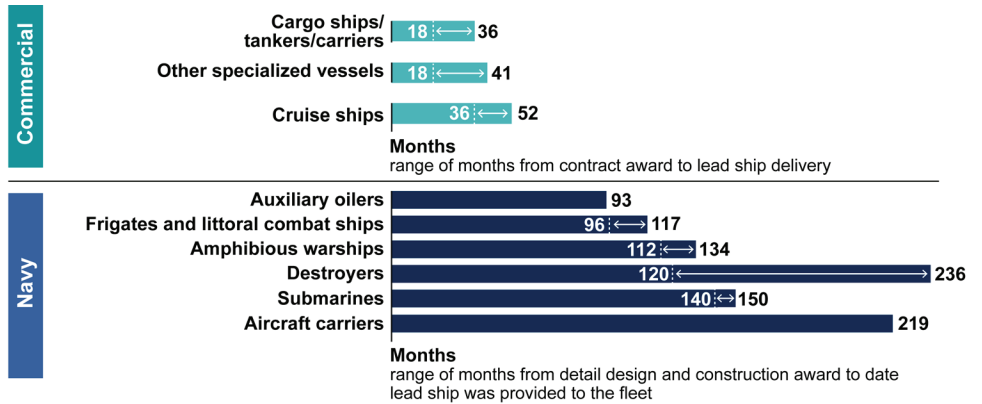
Changing maritime threats are pushing the U.S. Navy to increase its pace for designing and delivering new ships. Since 2009, GAO has used leading practices in commercial shipbuilding to evaluate the plans and execution of Navy shipbuilding programs. GAO's numerous recommendations have spurred Navy action to improve acquisition practices and the use of taxpayer dollars. Yet, the Navy has continued to face persistent challenges in its ability to design and deliver timely, affordable new ships that perform as expected.

Computing power and digital design capabilities have rapidly changed in the 15 years since GAO first identified leading ship design practices. As a result, GAO's examination of commercial industry's current practices helps ensure that the activities and performance of the Navy's shipbuilding programs are evaluated against cutting-edge practices used to design new ships efficiently and effectively.

Key Takeaways

GAO found that leading commercial ship buyers and builders prioritize shorter, predictable periods for design and construction, which result in delivering timely ships that meet current user needs. In contrast, the Navy's approach often results in significantly longer design and construction cycle times for its shipbuilding programs' lead ships.

Comparison of Design and Construction Cycles for Selected Commercial and Navy Ships



Source: GAO analysis of commercial company and Navy information. | GAO-24-105503

Note: For commercial ships, the range of months indicates the shortest and longest typical periods for companies to deliver a lead ship after contract award. For Navy ships, the range of months for different ship types indicates the shortest and longest periods for the Navy to provide selected lead ships to the fleet since 2007. For Navy programs with a contract prior to the detail design and construction award, the earlier award date represents the start of the cycle.

Key differences between commercial companies' and the Navy's ship design practices contribute to the slower pace and less predictable cost, schedule, and performance outcomes for Navy shipbuilding programs. Leading design practices involve

- effective management of a ship's business case—a reflection of the balance of customer needs and the resources needed to develop and produce the ship; and
- focus on efficiently maturing new ship designs to better inform decisions on schedule, cost, and performance. This includes using consistent, meaningful design maturity measures to determine readiness to move from design to construction.

How GAO Did This Study

A conference report directed GAO to examine ship design practices. This report assesses (1) the leading design practices used by commercial ship buyers and builders to inform their understanding of design maturity and readiness for construction, and (2) how the Navy's ship design practices compare to the leading practices in commercial ship design. To address these objectives, GAO interviewed and reviewed documentation from four commercial ship buyers and five shipbuilders—builders generally also design the ships. GAO selected these companies using criteria reflective of commercial success in designing, building, and buying ships relatable to Navy ships. GAO also reviewed its prior work on leading practices for shipbuilding and product development. In addition, GAO reviewed documentation and interviewed representatives from the Navy and selected Navy shipbuilders, as well as reviewed prior work on Navy shipbuilding program efforts. Based on the results of these activities, GAO compared the ship design practices used by the Navy with leading commercial practices.

What GAO Recommends

GAO is raising to the attention of Congress three matters for its consideration regarding reporting and certification requirements. The matters would enable Congress to gain additional information on design maturity for Navy shipbuilding programs. GAO is also making eight recommendations to the Secretary of the Navy, which are intended to support improvements to the Navy's design approach, decision-making practices, and design capabilities that facilitate more timely, predictable outcomes for its shipbuilding programs. The Navy agreed with seven recommendations and partially agreed with one recommendation. GAO continues to believe that all eight recommendations should be fully implemented.

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GAO Comparison of Leading Ship Design Practices for Commercial Companies and U.S. Navy

Establish business cases and requirements that support predictable design outcomes



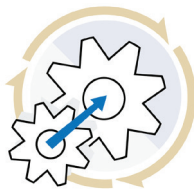
Commercial

- Prioritizes timeliness of ship design and delivery
- Avoids overly prescriptive requirements
- Maintains a sound business case through continued reevaluation

Navy

- Progresses through an extensive requirements process, with significant time elapsing before detail design and construction contracts
- No regularly required reevaluation of approved requirements to confirm their continued relevance

Use iterative design to accelerate design maturity



Commercial

- Ensures schedule, cost, and requirements expectations are informed by sufficient design knowledge
- Prioritizes user involvement in the ship design process
- Leverages existing ship designs and systems in digital libraries
- Prioritizes timely vendor decisions and information

Navy

- Sets expectations for schedule, cost, and operational requirements when design is unstable, resulting in less design knowledge available to inform key decisions and increased program risk
- Generally uses a longer, more linear approach—with less consistent user involvement—focusing on new designs with extensive and novel capability rather than speed to delivery
- Makes some use of existing ship designs, but lacks a robust design library to support iterative design and shorten time needed to mature new designs
- Generally takes extended time to finalize vendor decisions for ship systems and receive vendor-furnished information needed to mature ship designs

Use efficient ship design collaboration and decision-making practices



Commercial

- Uses processes that support timely design decisions
- Aligns decision-making with design maturity measures

Navy

- Lacks streamlined, more time-constrained processes, with numerous stakeholders having decision-making authority and contributing to extended cycle times to finalize designs
- Lacks consistent design maturity measures and a clear connection between those measures and decision-making

Employ robust in-house ship design capabilities and tools



Commercial

- Maintains strong in-house design workforce capabilities
- Uses ship design tools to shorten cycle time

Navy

- Evaluating ways to address acknowledged shortfalls in its in-house design workforce and tools
- Adopting modern design tools to varying degrees, with the potential for expanded, more consistent use to provide efficiencies that support shorter, more predictable cycle times for ship design

Source: GAO analysis of commercial company and Navy information; GAO (icons). | GAO-24-105503