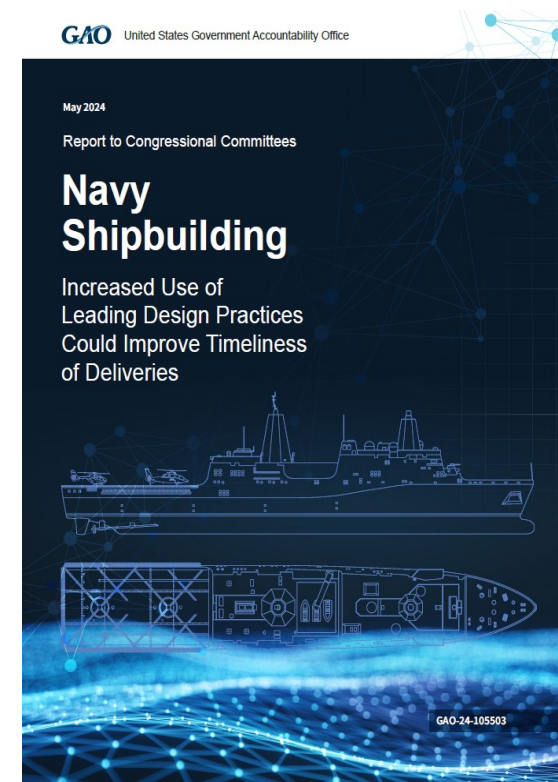


# **Navy Shipbuilding: Increased Use of Leading Design Practices Could Improve Timeliness of Deliveries**

**GAO-24-105503 (Published May 2, 2024)**

**2025 Naval Postgraduate School Symposium**

**Presentation by: Sean Merrill, Senior Analyst  
Contracting and National Security Acquisitions  
U.S. Government Accountability Office**



## Reporting Objectives

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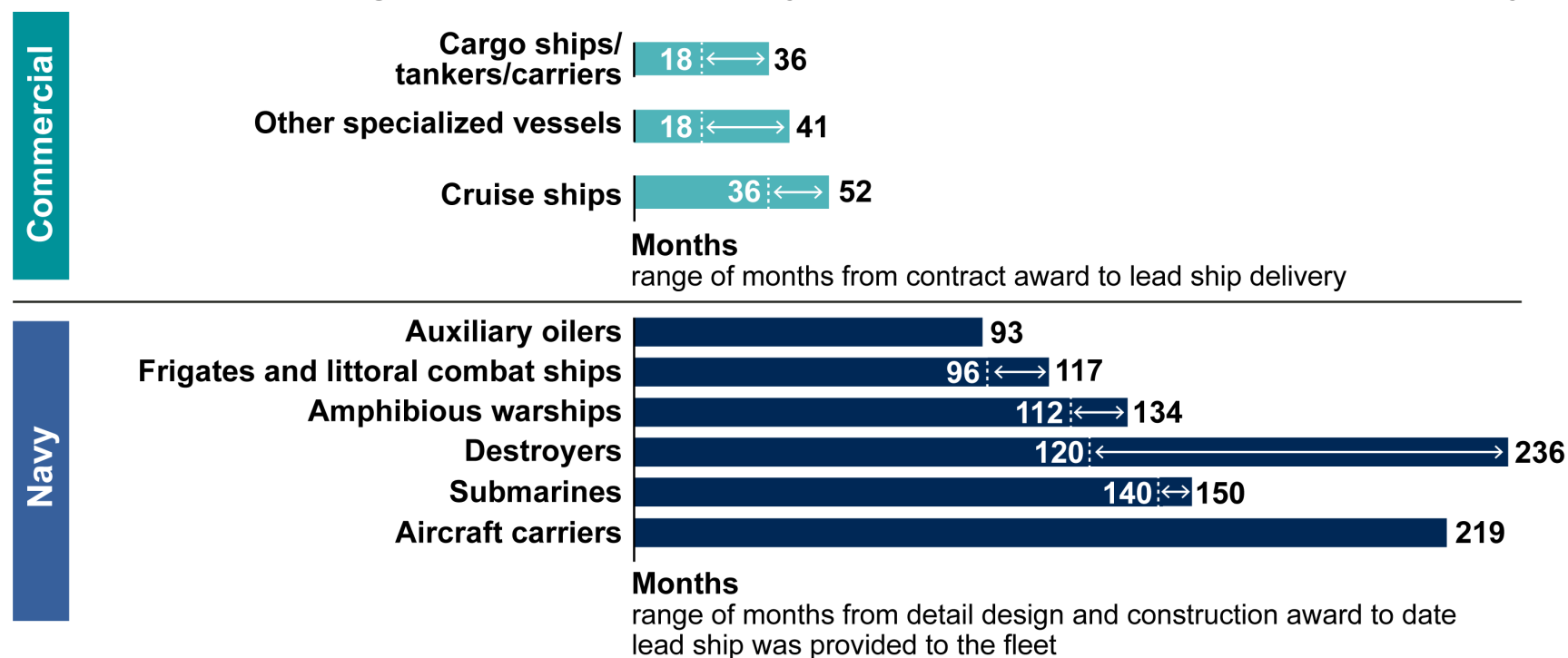
Our review focused on addressing two key questions:

1. What are the leading ship design practices used by commercial ship buyers and builders to inform their understanding of design maturity and readiness for construction?
2. How do Navy ship design practices compare to leading practices in commercial ship design?

We reviewed the practices of leading commercial companies in ship buying and building and Navy shipbuilders and programs reflecting a range of ship classes

# Long Cycle Times Increase Program Risks for New Ship Designs

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



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

**Our work did not seek to create expectations for Navy shipbuilding programs to replicate commercial delivery timelines or advocate for use of commercial designs**

## Leading Practices Supporting Timely Ship Design and Delivery

### Key Ship Design Practices Used by Commercial Ship Buyers and Builders



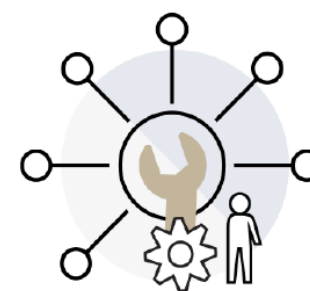
Establish business cases and requirements that support predictable design outcomes



Use iterative design to accelerate ship design maturity



Use efficient ship design collaboration and decision-making practices



Employ robust in-house ship design capabilities and tools

Source: GAO analysis of commercial company information; GAO (icons).



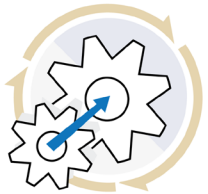
# Business Case and Requirements That Support Predictable Design Outcomes

## 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



# Iterative Design to Accelerate Design Maturity

## Commercial:

- Ensures sufficient design knowledge informs schedule, cost, and requirements expectations
- 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 schedule, cost, and operational requirements when design is unstable
- Longer, linear approach—with less consistent user involvement—focused on designs with extensive and novel capability rather than speed to delivery
- Lacks robust design library to support iterative design and shorten time needed to mature new designs
- Extended time to finalize vendor decisions for ship systems and receive vendor-furnished information needed to mature ship designs



# Efficient Ship Design Collaboration and Decision-Making Practices

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## **Commercial:**

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

## **Navy:**

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



# 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 potential for expanded, more consistent use to provide efficiencies that support shorter, more predictable cycle times for ship design

# Improving Navy Design Processes to Speed Ship Delivery

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## Opportunities to improve Navy ship design practices:

- Increase the level of design maturity achieved before making decisions on construction contract awards
- Better align Navy reporting and certification requirements with leading practices
- Standardize Navy expectations for measuring and communicating design maturity
- Expand digital library of existing ship and system designs to create design efficiencies
- Improve processes and resources to streamline decision-making
- Increase direct user involvement throughout the design process
- Increase use of modern design tools to improve ship design and shorten cycle times



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## **GAO Director for GAO-24-105503 (Published May 2, 2024)**

Shelby S. Oakley, Contracting and National Security Acquisitions, [OakleyS@gao.gov](mailto:OakleyS@gao.gov)

### **Public Affairs**

Sarah Kaczmarek, Managing Director, [Media@gao.gov](mailto:Media@gao.gov)

### **Congressional Relations**

A. Nicole Clowers, Managing Director, [CongRel@gao.gov](mailto:CongRel@gao.gov)

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