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Navy John Lewis (TAO-205) Class Oiler Shipbuilding Program: Background and Issues for Congress

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Summary

The Navy procured its first John Lewis (TAO-205) class oiler in FY2016, and a total of six have been procured through FY2021, including the fifth and sixth in FY2020. The first six TAO-205s are being procured under a block buy contract that was authorized by Section 127 of the FY2016 National Defense Authorization Act (S. 1356/P.L. 114-92 of November 25, 2015), and are being built by General Dynamics/National Steel and Shipbuilding Company (GD/NASSCO) of San Diego, CA.

The Navy wants to procure a total of 20 TAO-205s. The Navy's proposed FY2022 budget requests $668.2 million for the procurement of a seventh TAO-205 class ship, and an additional $76.0 million in advance procurement (AP) funding for the procurement of another TAO-205 in a future fiscal year.

Issues for Congress include the following:

- the potential impact of the COVID-19 situation on the execution of U.S. military shipbuilding programs, including the TAO-205 program;
- whether to procure one TAO-205 class ship (as requested), no TAO-205 class ship, or two TAO-205 class ships in FY2022;
- the total number of TAO-205s the Navy will require in coming years to support its operations, particularly in light of the Navy's new Distributed Maritime Operations (DMO) operating concept;
- issues regarding the TAO-205 program discussed in a June 2020 Government Accountability Office (GAO) report assessing major DOD acquisition programs; and
- whether to encourage or direct the Navy to build TAO-205s with more ship self-defense equipment than currently planned by the Navy.

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Introduction

This report provides background information and issues for Congress on the John Lewis (TAO-205) class oiler shipbuilding program, a program to build a new class of 20 fleet oilers for the Navy. The issue for Congress is whether to approve, reject, or modify the Navy's annual ship authorization and funding requests for the program. Congress's decisions on this issue could affect Navy capabilities and funding requirements and the U.S. shipbuilding industrial base.

Background

Navy Fleet Oilers

Role of Fleet Oilers

The primary role of Navy fleet oilers is to transfer fuel to Navy surface ships that are operating at sea, so as to extend the operating endurance of these surface ships and their embarked aircraft. Fleet oilers also provide other surface ships with lubricants, fresh water, and small amounts of dry cargo. Fleet oilers transfer fuel and other supplies to other surface ships in operations called underway replenishments (UNREPs). During an UNREP, an oiler steams next to the receiving ship and transfers fuel by hose (see **Figure 1**, **Figure 2**, and **Figure 3**).[1]

Oilers are one kind of Navy UNREP ship; other Navy UNREP ships include ammunition ships, dry cargo ships, and multiproduct replenishment ships. The Navy's UNREP ships are known more formally as the Navy's combat logistics force (CLF). Most of the Navy's CLF ships are operated by the Military Sealift Command (MSC).

Although the role of fleet oilers might not be considered as glamorous as that of other Navy ships, fleet oilers are critical to the Navy's ability to operate in forward-deployed areas around the world on a sustained basis. The U.S. Navy's ability to perform UNREP operations in a safe and efficient manner on a routine basis is a skill that many other navies lack. An absence of fleet oilers would significantly complicate the Navy's ability to operate at sea on a sustained basis in areas such as the Western Pacific or the Indian Ocean/Persian Gulf region. The Navy states that

> the ability to rearm, refuel and re-provision our ships at sea, independent of any restrictions placed on it by a foreign country, is critical to the Navy's ability to project warfighting power from the sea.

[1] The Navy states that

> A typical connected replenishment starts when a warship makes an "approach" on a CLF ship. The CLF ship maintains steady course and speed while the "customer ship" approaches and comes alongside the CLF ship, matching course and speed. The distance between the two ships is usually between 120-200 feet. The CLF ship then passes heavy metal wires, to the customer ship, that are connected at the replenishment stations. These wires are placed under tension to support fuel hoses for refueling operations or trolleys that move pallets of provisions, ammunition, or other cargo from ship to ship. Ships with flight decks can also receive provisions and ammunition via vertical replenishment. During this evolution a helicopter transfers cargo in external sling loads, or in the case of mail or passengers, inside the helicopter.
>
> (Statement of Mr. F. Scott DiLisio, Director, Strategic Mobility / Combat Logistics Division, Office of the Chief of Naval Operations, on the Logistics and Sealift Force Requirements and Force Structure Assessment Before the House Armed Services Committee Seapower and Projection Forces Subcommittee, July 30, 2014, p. 3.)

As the lifeline of resupply to Navy operating forces underway, the ships of the Navy's Combat Logistic Force (CLF) enable Carrier Strike Groups and Amphibious Ready Groups to operate forward and remain on station during peacetime and war, with minimal reliance on host nation support.[2]

Figure 1. Fleet Oiler Conducting an UNREP

Source: Navy photo accessed May 5, 2014, at http://www.navy.mil/view_image.asp?id=163895. The Navy states that the photo is dated October 24, 2013, and shows the oiler *Tippecanoe* (TAO-199) extending its fuel probe to the Aegis cruiser USS *Antietam* (CG-54), a part of the *George Washington* (CVN-73) Carrier Strike Group, in the South China Sea.

Existing *Kaiser* (TAO-187) Class Oilers

The Navy's existing force of fleet oilers consists of 15 *Henry J. Kaiser* (TAO-187) class ships (**Figure 4**), commonly called *Kaiser*-class oilers for short.[3] These ships were procured between FY1982 and FY1989 and entered service between 1986 and 1996. They have an expected service life of 35 years; the first ship in the class will reach that age in 2021. The ships are about 677 feet long and have a full load displacement of about 41,000 tons, including about 26,500 tons of fuel and other cargo. The ships were built by Avondale Shipyards of New Orleans, LA, a shipyard that eventually became part of the shipbuilding firm Huntington Ingalls Industries (HII). HII subsequently wound down Navy shipbuilding operations at Avondale, and the facility no longer builds ships. (HII continues to operate two other shipyards that build Navy ships.)

[2] Statement of Mr. F. Scott DiLisio, Director, Strategic Mobility / Combat Logistics Division, Office of the Chief of Naval Operations, on the Logistics and Sealift Force Requirements and Force Structure Assessment Before the House Armed Services Committee Seapower and Projection Forces Subcommittee, July 30, 2014, pp. 2-3.

[3] The oilers shown in **Figure 1**, **Figure 2**, and **Figure 3** are also *Kaiser*-class class oilers.

Figure 2. Fleet Oiler Conducting an UNREP

Source: Cropped version of Navy photo accessed May 5, 2014, at http://www.navy.mil/view_image.asp?id=61415. The Navy states that the photo is dated July 13, 2008, and shows the oiler *Leroy Grumman* (TAO-195) refueling the frigate *Underwood* (FFG-36) during an exercise with the *Iwo Jima* (LHD-7) Expeditionary Strike Group in the Atlantic Ocean.

Figure 3. Fleet Oiler Conducting an UNREP

Source: Cropped version of Navy photo accessed May 5, 2014, at http://www.navy.mil/view_image.asp?id=1737. The Navy states that the photo is dated June 19, 2002, and shows the oiler *Walter S. Diehl* (TAO-193), at center, conducting simultaneous UNREPs with the aircraft carrier *John F. Kennedy* (CV-67) and the Aegis destroyer *Hopper* (DDG-70). CV-67, a conventionally powered carrier, has since retired from the Navy, and all of the Navy's aircraft carriers today are nuclear powered. Even so, Navy oilers continue to conduct UNREPs with Navy aircraft carriers to provide fuel for the carriers' embarked air wings.

Figure 4. *Kaiser* (TAO-187) Class Fleet Oiler

Source: Cropped version of U.S. Navy image accessed April 14, 2014, at http://www.navy.mil/management/photodb/photos/130703-N-TG831-240.jpg. (The oilers shown in **Figure 1**, **Figure 2**, and **Figure 3** are also *Kaiser*-class class oilers.)

TAO-205 Program

Program Name

Navy oilers carry the designation TAO (sometimes written as T-AO). The T means that the ships are operated by MSC with a mostly civilian crew; the A means it is an auxiliary ship of some kind; and the O means that it is, specifically, an oiler. TAO-205 will be the Navy's next oiler after TAO-204, which is the final *Kaiser*-class oiler.

On January 6, 2016, then-Secretary of the Navy Ray Mabus announced that the TAO-205 class ships will be named for "people who fought for civil rights and human rights,"[4] and that the first ship in the class, TAO-205, which was procured in FY2016, was being be named for Representative John Lewis,[5] making TAO-205 one of a small number of Navy ships that have been named for people who were living at the time that the naming announcement was made.[6] TAO-205 class ships consequently are now known as John Lewis-class oilers.

[4] Valerie Insinna, "Navy to Name Next Generation Oilers for Civil Rights Icons," *Defense Daily*, January 7, 2016. For more on the names of TAO-205 class ships, see CRS Report RS22478, *Navy Ship Names: Background for Congress*, by Ronald O'Rourke.

[5] "Secretary of the Navy Ray Mabus Names Fleet Replenishment Oiler," *Navy News Service*, January 6, 2016; Sam LaGrone, "SECNAV Mabus Names First TAO(X) Next Generation Oiler After Rep. John Lewis," *USNI News*, January 6, 2016; "Navy to Name New Oiler after Civil Rights Icon," *Military.com*, January 6, 2020; Valerie Insinna, "Navy to Name Next Generation Oilers for Civil Rights Icons," *Defense Daily*, January 7, 2016.

[6] Representative Lewis died on July 17, 2020. For more on Navy ships named for people who were living at the time that the naming announcement was made, see CRS Report RS22478, *Navy Ship Names: Background for Congress*, by Ronald O'Rourke.

Ship Design and Capabilities

The TAO-205 class design (**Figure 5**) will have capabilities similar to those of the *Kaiser*-class ships, and will rely on existing technologies rather than new technologies. To guard against oil spills, TAO-205s are to be double-hulled, like modern commercial oil tankers, with a space between the two hulls to protect the inner hull against events that puncture the outer hull. (The final *Kaiser*-class ships are double-hulled, but earlier ships in the class are single-hulled.)

Figure 5. Artist's Rendering of the Oiler *John Lewis* (TAO-205)

Source: "US Navy Picks General Dynamics to Build First Six T-AO 205 Replenishment Oilers," *NavalToday.com*, July 1, 2016, which credits the image to GD/NASSCO. The background shows the skyline of San Diego, where GD/NASSCO is located.

Planned Total Procurement Quantity

Currently Planned Total Procurement Quantity of 20

The required number of oilers largely depends on the numbers and types of other surface ships (and their embarked aircraft) to be refueled, and the projected operational patterns for these ships and aircraft. The Navy's current force-level objective, released on December 15, 2016, calls for achieving and maintaining a 355-ship fleet, including 32 CLF ships, of which 20 are to be TAO-205s.[7] Consistent with this plan, the Navy currently wants to procure a total of 20 TAO-205s.

Potential Change in Planned Total Procurement Quantity Under Navy's Force-Level Goal

The Navy and DOD since 2019 have been working to develop a new Navy force-level goal to replace the Navy's current 355-ship force-level goal. On December 9, 2020, the outgoing Trump

[7] For more on the Navy's 355-ship force-level goal, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

Administration released a document that can be viewed as its own vision for future Navy force structure and/or a draft version of the FY2022 30-year Navy shipbuilding plan.[8] The document presents an envisioned Navy force-level goal for achieving by 2045 a Navy with a more distributed fleet architecture, including 382 to 446 manned ships and 143 to 242 large unmanned vehicles (UVs). The fleet of 382 to 446 manned ships called for in the document includes 69 to 87 CLF ships, or 37 to 55 more CLF ships than the 32 CLF ships that are called for under the Navy's current 355-ship force-level goal.

The expanded CLF fleet called for in the December 9, 2020, document includes a significant number of envisioned new CLF ships called Next-Generation Logistics Ships (NGLSs), which are covered in another CRS report.[9] It is possible, however, that the 69- to 87-ship CLF force called for in the December 9, 2020, document also includes a goal for more than 20 TAO-205s. In establishing a new Navy force-level goal to replace the current 355-ship goal, the Biden Administration can choose to adopt, revise, or set aside the December 9, 2020, document.

Planned Annual Procurement Quantities

The Navy procured the first TAO-205 in FY2016, the second in FY2018, the third and fourth in FY2019, and the fifth and sixth in FY2020. Under the Navy's FY2022 budget submission, the first TAO-205 is scheduled for delivery in March 2022. **Table 1** compares annual numbers of TAO-205s scheduled for procurement under the Navy's FY2020, FY2021, and FY2022 budget submissions and the Trump Administration's December 9, 2020, document, with the final line showing, for reference, the actual numbers procured in FY2020 and FY2021.

Table 1. Planned Annual TAO-205 Procurement Quantities

	FY20	FY21	FY22	FY23	FY24	FY25	FY26
FY2020 budget submission	2	1	1	2	1		
FY2021 budget submission		0	0	1	2	1	
Trump Admin. Dec. 9, 2020, document			1	2	2	2	2
FY2022 budget submission			1	n/a	n/a	n/a	n/a
Actual number procured in FY20 and FY21	2	0					

Source: Table prepared by CRS based on Navy's FY2020 and FY2021 budget submissions and Trump Administration December 9, 2020, document on Navy force structure and shipbuilding.

Note: N/a means not available—the Navy's FY2022 budget submission does not include line-item details FY2023-FY2026.

Unit Procurement Cost

Under the Trump Administration's December 9, 2020, document, TAO-205s have an estimated unit procurement cost of roughly $650 million when purchased at a rate of two ships per year, and something more than that when purchased at a rate of one ship per year.

[8] For additional discussion of this document, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

[9] See CRS In Focus IF11674, *Navy Next-Generation Logistics Ship (NGLS) Program: Background and Issues for Congress*, by Ronald O'Rourke.

Builder

The first six TAO-205s are being built by General Dynamics/National Steel and Shipbuilding Company (GD/NASSCO) of San Diego, CA, a shipyard that builds Navy auxiliaries and DOD sealift ships.

Block Buy Contract

The first six TAO-205s are being procured under a block buy contract that was authorized by Section 127 of the FY2016 National Defense Authorization Act (S. 1356/P.L. 114-92 of November 25, 2015). It was earlier estimated that the block buy contract would reduce the procurement cost of the second through sixth TAO-205s by an average of about $45 million each, compared to costs under the standard or default DOD approach of annual contracting.[10] The Navy states that about $35 million of the $45 million in per-ship savings will come from using advance procurement (AP) funding for batch-ordering TAO-205 components. The Navy states that this use of AP funding could have occurred under annual contracting, and that the savings that are intrinsic to the block buy contract are thus about $10 million per ship.[11]

FY2021 Legislation Regarding U.S. Content Requirement for Certain Components

Section 845 of the FY2021 National Defense Authorization Act (H.R. 6395/P.L. 116-283 of January 1, 2021) states (emphasis added):

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[10] The Senate Armed Services Committee, in its report (S.Rept. 114-49 of May 19, 2015) on the FY2016 National Defense Authorization Act (S. 1376), stated:

> **Fleet replenishment oiler program (sec. 118)**
>
> The committee recommends a provision [Section 118] that would grant the Secretary of the Navy contracting authority to procure up to six fleet replenishment oilers (T–AO(X)). This new ship class is a nondevelopmental recapitalization program based on existing commercial technology and standards. The ship design is considered to be low risk by the Navy, with the design scheduled to be complete prior to the start of construction on the lead ship. This provision would generate an estimated $45.0 million in savings per ship compared to annual procurement cost estimates. In addition, the provision would provide a long-term commitment to the shipbuilder and vendors, which would enable workforce stability and planning efficiency. (Pages 11-12)

The committee print that includes the legislative text and joint explanatory statement for the enacted FY2016 National Defense Authorization Act (S. 1356/P.L. 114-92 of November 25, 2015) stated:

> *Fleet replenishment oiler program (sec. 127)*
>
> The Senate amendment contained a provision (sec. 118) that would grant the Secretary of the Navy contracting authority to procure up to six fleet replenishment oilers (T–AO (X)). This new ship class is a non-developmental recapitalization program based on existing commercial technology and standards. The ship design is considered to be low risk by the Navy, with the design scheduled to be complete prior to the start of construction on the lead ship. This provision would enable an estimated $45.0 million in savings per ship, for ships 2–6, for a total of $225.0 million in savings compared to current annual procurement cost estimates.
>
> (114th Congress, 1st Session, Committee Print No. 2, *National Defense Authorization Act for Fiscal Year 2016, Legislative Text and Joint Explanatory Statement to accompany* S. 1356, P.L. 114-92, *November 2015*, Printed for the use of the Committee on Armed Services of the House of Representatives, p. 608)

For more on block buy contracts, see CRS Report R41909, *Multiyear Procurement (MYP) and Block Buy Contracting in Defense Acquisition: Background and Issues for Congress*, by Ronald O'Rourke and Moshe Schwartz.

[11] Source: Navy briefing on TAO-205 program for CRS and CBO, April 12, 2019.

SEC. 845. MISCELLANEOUS LIMITATIONS ON THE PROCUREMENT OF GOODS OTHER THAN UNITED STATES GOODS.

(a) IN GENERAL.—Section 2534 of title 10, United States Code, is amended—

(1) in subsection (a)—

(A) by striking paragraphs (2) through (5) and redesignating paragraph (6) as paragraph (3);

(B) by inserting after paragraph (1) the following new paragraph:

''(2) COMPONENTS FOR NAVAL VESSELS.—The following components of vessels, to the extent they are unique to marine applications:

''(A) Gyrocompasses.

''(B) Electronic navigation chart systems.

''(C) Steering controls.

''(D) Propulsion and machinery control systems.

''(E) Totally enclosed lifeboats.'';

(C) in paragraph (3), as so redesignated, by striking ''subsection (k)'' and inserting ''subsection (j)''; and

(D) by adding at the end the following new paragraph:

''(4) COMPONENTS FOR T–AO 205 CLASS VESSELS.—The following components of T–AO 205 class vessels:

''(A) Auxiliary equipment, including pumps, for all shipboard services.

''(B) Propulsion system components, including engines, reduction gears, and propellers.

''(C) Shipboard cranes.

''(D) Spreaders for shipboard cranes.'';

(2) by amending subsection (b) to read as follows:

''(b) MANUFACTURER IN THE NATIONAL TECHNOLOGY AND INDUSTRIAL BASE.—A manufacturer meets the requirements of this subsection if the manufacturer is part of the national technology and industrial base.'';

(3) in subsection (c)—

(A) by striking ''ITEMS.—'' and all that follows through ''Subsection (a) does not apply" and inserting ''ITEMS.—Subsection (a) does not apply''; and

(B) by striking paragraphs (2) though (5);

(4) in subsection (g)—

(A) by striking ''(1) This section'' and inserting ''This section''; and

(B) by striking paragraph (2);

(5) in subsection (h), by striking ''subsection (a)(3)(B)'' and inserting ''subsection (a)(2)'';

(6) in subsection (i)(3), by striking ''Under Secretary of Defense for Acquisition, Technology, and Logistics'' and inserting ''Under Secretary of Defense for Acquisition and Sustainment'';

(7) by striking subsection (j);

> (8) by redesignating the first subsection designated subsection (k) (relating to ''Limitation on Certain Procurements Application Process'') as subsection (j); and
>
> (9) in subsection (k) (relating to ''Implementation of Auxiliary Ship Component Limitation''), by striking ''Subsection (a)(6)'' and inserting ''Subsection (a)(3)''.
>
> (b) REVIEW OF SELECT COMPONENTS.—The Secretary of the Defense shall expedite the review period under paragraph (3)(B) of section 2534(j) of title 10, United States Code, as redesignated by subsection (a), to not more than 60 days for applications submitted pursuant to such section 2534(j) for the following components for auxiliary ships:
>
> (1) Auxiliary equipment, including pumps, for all shipboard services.
>
> (2) Propulsion system components, including engines, reduction gears, and propellers.
>
> (3) Shipboard cranes.
>
> (4) Spreaders for shipboard cranes.

Section 8113(a) of the FY2021 DOD Appropriations Act (Division C of H.R. 133/P.L. 116-260 of December 27, 2020, the Consolidated Appropriations Act, 2021) states:

> SEC. 8113. (a) None of the funds provided in this Act for the TAO Fleet Oiler program shall be used to award a new contract that provides for the acquisition of the following components unless those components are manufactured in the United States: Auxiliary equipment (including pumps) for shipboard services; propulsion equipment (including engines, reduction gears, and propellers); shipboard cranes; and spreaders for shipboard 2 cranes.

FY2022 Funding

The Navy's proposed FY2022 budget requests $668.2 million for the procurement of a seventh TAO-205 class ship, and an additional $76.0 million in advance procurement (AP) funding for the procurement of another TAO-205 in a future fiscal year.

Issues for Congress

Potential Impact of COVID-19 Situation

One issue for Congress concerns the potential impact of the COVID-19 situation on the execution of U.S. military shipbuilding programs, including the TAO-205 program. For additional discussion of this issue, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

Number of TAO-205s to Procure in FY2022

Another issue for Congress is whether to procure one TAO-205 class ship (as requested), no TAO-205 class ship, or two TAO-205s in FY2022. In assessing this issue, Congress may consider various factors, including the following:

- the expected service lives and scheduled retirement dates of the existing TAO-187 class oilers;
- construction times for new TAO-205s;
- potential changes in the required number of oilers (see next section);
- shipyard workloads and employment levels at NASSCO;

- the amount of funding that would be needed to procure one or two TAO-205s in FY2022; and
- competing Navy or other DOD uses for such funding.

Total Required Number of TAO-205s

Another issue for Congress concerns the total number of TAO-205s the Navy will require in coming years to support its operations. The Navy is implementing a new operational concept, called Distributed Maritime Operations (DMO), that could lead to the development of a fleet with larger numbers of individually smaller ships, and to more-widely dispersed Navy operations. DMO could affect requirements for Navy logistics, including oilers. The Navy states that

> Recapitalizing the auxiliary and sealift fleet in support of DMO has become a top priority. The initial reviews of the requirements to support this operational maritime concept indicate potential growth across the five lines of effort: refuel, rearm, resupply, repair, and revive. Coincident is the review of the level of effort needed to distribute logistics into a contested maritime environment following safe transfer by the logistics fleet—smaller, faster, multi-mission transports likely resident within the future battle force. The work to fully flesh out the requirement is ongoing, but the aggregate is expected to be no less than the current requirement, reinforcing the urgency to recapitalize the current fleet.[12]

As mentioned earlier, the Navy and DOD since 2019 have been working to develop a new Navy force-level goal to replace the Navy's current 355-ship force-level goal. On December 9, 2020, the outgoing Trump Administration released a document that can be viewed as its own vision for future Navy force structure and/or a draft version of the FY2022 30-year Navy shipbuilding plan.[13] The document presents an envisioned Navy force-level goal for achieving by 2045 a Navy with a more distributed fleet architecture, including 382 to 446 manned ships and 143 to 242 large unmanned vehicles (UVs). The fleet of 382 to 446 manned ships called for in the document includes 69 to 87 CLF ships, or 37 to 55 more CLF ships than the 32 CLF ships that are called for under the Navy's current 355-ship force-level goal.

The expanded CLF fleet called for in the December 9, 2020, document includes a significant number of envisioned new CLF ships called Next-Generation Logistics Ships (NGLSs), which are covered in another CRS report.[14] It is possible, however, that the 69- to 87-ship CLF force called for in the December 9, 2020, document also includes a goal for more than 20 TAO-205s. In establishing a new Navy force-level goal to replace the current 355-ship goal, the Biden Administration can choose to adopt, revise, or set aside the December 9, 2020, document.

Issues Discussed in June 2020 GAO Report

A June 2020 Government Accountability Office (GAO) report—the 2020 edition of an annual GAO report assessing major DOD acquisition programs—stated the following about the TAO-205 program:

> **Technology Maturity, Design Stability, and Production Readiness**

[12] U.S. Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, March 2019, p. 24.

[13] For additional discussion of this document, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

[14] See CRS In Focus IF11674, *Navy Next-Generation Logistics Ship (NGLS) Program: Background and Issues for Congress*, by Ronald O'Rourke.

All Lewis class critical technologies are mature and the design is stable. The critical technologies were all determined to be mature based on prototype testing conducted before detail design contract award—an approach consistent with best practices.

Lead ship construction began in September 2018 with 95 percent of the ship's total design effort, including the basic and functional design, complete—also consistent with best practices. Throughout detail design and now into construction, the Navy has not changed the Lewis class program's performance requirements. The Navy also leveraged commercial vessel designs to minimize design and construction risks. The Lewis class features a modern double-hull construction, an environmental-based design standard for commercial tankers, to ensure the ships can dock at ports-of-call.

According to the program office, as of January 2020, lead ship construction was 65 percent complete and second ship construction was less than 10 percent complete. Both ships experienced cost growth primarily due to quantity increases but also due to higher-than-forecast overhead and labor costs; increasing costs of steel and vendor components; and, according to officials, a small amount of cybersecurity related design cost growth.

Delivery of the lead ship has slipped by 7 months from November 2020 to June 2021. Program officials stated that the delay is primarily due to late delivery of the ship's main reduction gear and delays by the subsidiary of the contractor. A tool for transporting reduction gears from a heat treatment cracked and needed to be replaced, causing the reduction gear delay. According to program officials, the flooding of a graving dock in 2018 shifted ship construction schedules and accelerated construction in certain trades, such as pipefitting. This increased production demand for additional pipes and vents that one subsidiary has been unable to meet and has negatively impacted the schedule for both the lead and second ships. In addition, while repairs are being planned and implemented, the graving dock's unavailability has disrupted the contractor's schedule for future ships. According to the program office, the flooding incident resulted in an average of 5- to 12-month delays to the delivery dates for ships two through six. As a result of these delays, the Lewis class will not meet its initial operational capability (IOC) date of January 2022. The revised IOC date is now August 2022.

Software and Cybersecurity

The program is using off-the-shelf software systems tailored for the T-AO 205 design and did not collect details of its software development costs or activities.

With regard to cybersecurity, the program conducted its first cyber tabletop test—an exercise used to assess the probability of success for attackers—in January 2018. Based on the results, the program has another cyber test scheduled in January 2020, which will include several of the ship's linked subsystems. The program reported it has experienced increases in costs related to meeting cybersecurity requirements. Specifically, officials reported that in March 2019, the program began making modifications to the contract to address cyber requirements that were not in effect at the 2016 contract award. The changes are expected to cost approximately $7.4 million over the first six ships, an amount that will be reflected in the program's forthcoming revised acquisition program baseline.

Other Program Issues

As part of the Navy's plan to expand the fleet, the Navy concluded in fiscal year 2019 that it would need an additional three Lewis class ships. To date, the Navy has procured six of the 20 ships the Navy plans to purchase. In addition to these six ships, the Navy plans to add one more ship to the low-rate initial production phase via a modification to what it refers to as the "block buy" contract. Program officials stated they plan to competitively award the remaining 13 ships, likely awarding contracts to more than one contractor. The program plans to use the same design for these 13 remaining ships.

Program Office Comments

We provided a draft of this assessment to the program office for review and comment. The program office provided technical comments, which we incorporated where appropriate. The program office stated that the lead ship's delivery initially slipped due to the late delivery of main engines and reduction gear, but was further impacted by the late delivery of outfitting material. The program office also stated the fiscal year 2021 President's budget submission removes the planned procurement of one ship each in fiscal years 2021 and 2022 but does not impact the six-ship "block buy" contract. The program office noted that the Navy plans to procure a seventh ship through the existing six-ship "block buy" contract in fiscal year 2022. The program office further noted that the revised acquisition program baseline is complete and reflects the planned update to the total number of ships.[15]

TAO-205 Ship Self-Defense Equipment

Another issue for Congress is whether to encourage or direct the Navy to build TAO-205s with more ship self-defense equipment than currently planned by the Navy. The issue relates to how changes in the international security environment might affect how the Navy operates and equips its underway replenishment ships. For additional background information on this issue, see **Appendix A**.

Legislative Activity for FY2022

Summary of Congressional Action on FY2022 Funding

Table 2 summarizes congressional action on the Navy's request for FY2022 procurement and advance procurement (AP) funding for additional TAO-205s.

Table 2. Congressional Action on FY2022 Funding for Additional TAO-205s

Millions of dollars, rounded to nearest tenth

		Authorization			Appropriation		
	Request	HASC	SASC	Conf.	HAC	SAC	Conf.
Procurement	668.2						
Advance procurement (AP)	76.0						
(Quantity)	*(1)*						

Source: Navy FY2022 budget submission, committee and conference reports, and explanatory statements on FY2022 National Defense Authorization Act and FY2022 DOD Appropriations Act.

Notes: HASC is House Armed Services Committee; **SASC** is Senate Armed Services Committee; **HAC** is House Appropriations Committee; **SAC** is Senate Appropriations Committee; **Conf.** is conference agreement.

[15] Government Accountability Office, *Defense Acquisitions Annual Assessment[:] Drive to Deliver Capabilities Faster Increases Importance of Program Knowledge and Consistent Data for Oversight*, GAO-20-439, p. 142.

Appendix A. TAO-205 Ship Self-Defense Equipment

This appendix provides additional background information on the issue of whether to encourage or direct the Navy to build TAO-205s with more ship self-defense equipment than currently planned by the Navy.

During the Cold War, the Navy procured underway replenishment ships to support a two-stage approach to underway replenishment in which single-product "shuttle" ships (such as oilers, ammunition ships, and dry stores ships) would take their supplies from secure ports to relatively safe mid-ocean areas, where they would then transfer them to multiproduct "station" ships called TAOEs and AORs. The TAOEs and AORs would then travel to Navy carrier strike groups operating in higher-threat areas and transfer their combined supplies to the carrier strike group ships. As a result, single-product shuttle ships were equipped with lesser amounts of ship self-defense equipment, and TAOEs and AORs were equipped with greater amounts of such equipment.

When the Cold War ended and transitioned to the post-Cold War era, threats to U.S. Navy ships operating at sea were substantially reduced. As a consequence, the amount of ship self-defense equipment on the TAOEs and AORs was reduced, and a single-stage approach to underway replenishment, in which oilers and dry stores ships took supplies from secure ports all the way to carrier strike group ships, was sometimes used.

Now that the post-Cold War era has transitioned to a new strategic environment featuring renewed great power competition with countries like China and Russia,[16] and a consequent renewal of potential threats to U.S. Navy ships operating at sea, the question is whether TAO-205s should be equipped with lesser amounts of ship self-defense equipment, like oilers were during both the Cold War and post-Cold War eras, or with greater amounts of ship self-defense equipment, like TAOEs and AORs were during the Cold War. Building TAO-205s with more ship self-defense equipment than currently planned by the Navy could increase TAO-205 procurement costs by tens of millions of dollars per ship, depending on the amount of additional ship self-defense equipment.

Section 1026 of the FY2016 National Defense Authorization Act (S. 1356/P.L. 114-92 of November 25, 2015) required an independent assessment of the Navy's combat logistics force ships. The report was delivered to Congress in February 2016. A copy of the report was posted by the media outlet Politico on March 11, 2016. The report states the following:

> The T-AO(X) will only have a limited capability to defeat a submarine launched torpedo attack and no capability to defeat a missile attack. When delivered, the TAO(X) will have:
>
> —[the] NIXIE Torpedo Countermeasure System [for decoying certain types of torpedoes]
>
> —[the] Advanced Degaussing System (Anti-Mine) [for reducing the ship's magnetic signature, so as to reduce the likelihood of attack by magnetically fused mines]
>
> When required, the T-AO(X) will also have ability to embark Navy Expeditionary Combat Command Expeditionary Security Teams (EST). The ESTs will embark with several crew served weapons and are designed to provide limited self-defense against a small boat attack.

[16] For more on this transition, see CRS Report R43838, *A Shift in the International Security Environment: Potential Implications for Defense—Issues for Congress*, by Ronald O'Rourke.

The T-AO(X) will have Space, Weight, Power and Cooling (SWAP-C) margins for future installations of the following systems:

—[the] Close In Weapon System (CIWS) or SeaRAM (Rolling Airframe Missile) [for defense against missile attack]

—[the] Anti-Torpedo Torpedo Defense System (ATTDS) [for destroying torpedoes]

Even after the installation of a CIWS or ATTDS, if the T-AO(X) was to operate in anything other than a benign environment, the ship will require both air and surface escorts.

The decision to rely on [other] Fleet assets to provide force protection [i.e., defense against attacks] for the T-AO(X) was validated by the JROC [in June 2015].[17]

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Disclaimer

[17] Department of the Navy, *Report to Congress on Requirements for the Fleet Replenishment Oiler, T-AO(X)*, February 2016 (with cover letter dated February 12, 2016), p. 8. The report was posted by Politico on March 11, 2016, at http://static.politico.com/1e/e0/f26a9fb1471aacd5358c420fcf10/navy-oiler-report.pdf, and accessed by CRS on March 15, 2016.