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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 began procuring John Lewis (TAO-205) class oilers in FY2016, and a total of six have been procured through FY2020, including two 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). The Navy's FY2021 budget submission estimates that TAO-205s cost about $530 million each when they are procured at a rate of two per year. The Navy wants to procure a total of 20 TAO-205s. The ships are being built by General Dynamics/National Steel and Shipbuilding Company (GD/NASSCO) of San Diego, CA.

The Navy's FY2020 budget submission projected a request for one TAO-205 class ship in FY2021 and programmed a total of six over the period FY2021-FY2025. Under the Navy's FY2021 budget submission, however, no TAO-205 class ship is requested for procurement in FY2021, and a total of four are programmed for the period FY2021-FY2025. The Navy's FY2021 budget requests $59.9 million in FY2021 cost-to-complete procurement funding to cover cost growth on TAO-205s procured in prior fiscal years, but it does not request any FY2021 funding for the procurement of additional TAO-205s.

Issues for Congress include the following:

- the potential impact of the COVID-19 (coronavirus) situation on the execution of U.S. military shipbuilding programs, including the TAO-205 program;
- whether to fund the procurement in FY2021 of no TAO-205 class ship (as requested by the Navy), one TAO-205 class ship (as was projected for FY2021 under the Navy's FY2020 budget submission), or two TAO-205s (as were procured in FY2020 and also in FY2019).
- the number of oilers 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; 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 Navy's proposed FY2021 budget does not request any funding for the procurement of additional TAO-205s.

Issues for Congress regarding the TAO-205 program include the number of TAO-205s to procure in FY2021, the number of oilers the Navy will require in coming years to support its operations, and whether to encourage or direct the Navy to build TAO-205s with more ship self-defense equipment than currently planned by the Navy.

For an overview of the strategic and budgetary context in which the TAO-205 program and other Navy shipbuilding programs may be considered, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

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).

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.

[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.)

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.

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.
>
> 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]

[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.

Figure 2. Fleet Oiler Conducting an UNREP

Source: 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.

Existing Henry J. 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**).[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.)

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

Figure 3. Fleet Oiler Conducting an UNREP

Source: 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.

TAO-205 Program

Program Name

The TAO-205 class program was originally called the TAO(X) program, with the (X) meaning that the exact design of the ship had not yet been determined. On January 6, 2015, then-Secretary of the Navy Ray Mabus announced that ships in the class 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, will be named for Representative John Lewis.[5] The class consequently is now known as the John Lewis (TAO-205) class.[6]

[4] Valerie Insinna, "Navy to Name Next Generation Oilers for Civil Rights Icons," *Defense Daily*, January 7, 2016: 4. For more on Navy ship names, 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.

[6] For more on the names of TAO-205 class ships, see CRS Report RS22478, *Navy Ship Names: Background for Congress*, by Ronald O'Rourke.

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

Source: 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.)

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.)

Total Planned Quantity

As part of its goal for achieving a fleet of 355 ships, the Navy wants to procure a total of 20 TAO-205s.[7] 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.

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. The first TAO-205 is scheduled for delivery in June 2021.

[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.

Figure 5. Artist's Rendering of 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.

Table 1 compares the Navy's FY2020 and FY2021 budget submissions in terms of numbers of TAO-205s programmed for procurement during the period FY2021-FY2025. As can be seen in the table, the Navy's FY2020 budget submission projected a request for one TAO-205 class ship in FY2021 and programmed a total of six TAO-205s over the period FY2021-FY2025, while the Navy's FY2021 budget submission does not request a TAO-205 class ship in FY2021 (or FY2022) and programs a total of four over the period FY2021-FY2025.

Table 1. TAO-205 Procurement Quantities, FY2021-FY2025

Under Navy's FY2020 and FY2021 budget submissions

	FY21	FY22	FY23	FY24	FY25	Total FY2021-FY2025
FY2020 budget	1	1	2	1	1	6
FY2021 budget	0	0	1	2	1	4
Difference	-1	-1	-1	+1	—	-2

Source: Table prepared by CRS based on navy's FY2020 and FY2021 budget submissions.

Unit Procurement Cost

The Navy's FY2021 budget submission estimates that TAO-205s cost about $530 million each when they are procured at a rate of two per year.

Builder

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.[8] 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.[9]

U.S. Content Requirement for Certain Components

Section 8113(a) of the FY2020 Appropriations Act (Division A of 1158/P.L. 116-93 of December 20, 2020) states the following:

> 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 cranes.

[8] 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.

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

May 2019 GAO Report

Appendix A presents the Government Accountability Office's (GAO's) assessment of the TAO-205 class program from GAO's annual report surveying DOD major acquisition programs.

FY2021 Funding

The Navy's FY2021 budget requests $59.9 million in FY2021 cost-to-complete procurement funding to cover cost growth on TAO-205s procured in prior fiscal years, but it does not request any FY2021 funding for the procurement of additional TAO-205s.

Issues for Congress

Potential Impact of COVID-19 (Coronavirus) Situation

One issue for Congress concerns the potential impact of the COVID-19 (coronavirus) 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 FY2021

One issue for Congress is whether to fund the procurement in FY2021 of no TAO-205 class ship (as requested by the Navy), or one TAO-205 class ship (as was projected for FY2021 under the Navy's FY2020 budget submission), or two TAO-205s (as were procured in in FY2020 and also in FY2019). 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;
- potential cost impacts (including shipyard and supplier firm production learning curve impacts) of procuring or not procuring one or two TAO-205s in FY2021;
- the amount of funding that would be needed to procure one or two TAO-205s in FY2021; and
- competing Navy or other DOD uses for such funding.

Required Number of Oilers

Another issue for Congress concerns the number of oilers 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.[10]

An August 2017 GAO report states the following:

> The readiness of the surge sealift and combat logistics fleets has trended downward since 2012. For example, GAO found that mission-limiting equipment casualties—incidents of degraded or out-of-service equipment—have increased over the past 5 years, and maintenance periods are running longer than planned, indicating declining materiel readiness across both fleets....
>
> The Navy has not assessed the effects of widely distributed operations, which could affect the required number and type of combat logistics ships. The Navy released its new operational concept of more widely distributed operations—ships traveling farther distances and operating more days to support a more distributed fleet—in 2017. The Navy has not assessed the effects that implementing this concept will have on the required number and type of combat logistics ships. These effects could be exacerbated in the event that the Navy is less able to rely on in-port refueling—which has comprised about 30 percent of all refuelings over the past 3 years—placing greater demand on the combat logistics fleet. Given the fleet's dependence on the combat logistics force, waiting until 2019 or 2020 to conduct an assessment, as planned, could result in poor investment decisions as the Navy continues to build and modernize its fleet. Furthermore, without assessing the effects of widely distributed operations on logistics force requirements and modifying its force structure plans accordingly, the Navy risks being unprepared to provide required fuel and other supplies.[11]

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**
>
> 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

[10] 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.

[11] Government Accountability Office, *Navy Readiness[:] Actions Needed to Maintain Viable Surge Sealift and Combat Logistics Fleets*, GAO-17-503, August 2017, summary page.

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.[12]

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 B**.

Legislative Activity for FY2021

Summary of Congressional Action on FY2021 Funding

Table 2 summarizes congressional action on the Navy's request for FY2021 funding for procurement of additional TAO-205s. (It consequently does not show the Navy's request for $59.9 million in cost-to-complete procurement funding to cover cost growth on TAO-205s procured in prior fiscal years.)

Table 2. Congressional Action on FY2021 Funding for Additional TAO-205s

Millions of dollars, rounded to nearest tenth

		Authorization			Appropriation		
	Request	HASC	SASC	Conf.	HAC	SAC	Conf.
Procurement	0						
Advance procurement (AP)	0						
(Quantity)	*(0)*						

Source: Navy FY2021 budget submission, committee and conference reports, and explanatory statements on FY2021 National Defense Authorization Act and FY2021 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.

[12] 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. May 2019 GAO Report

A May 2019 GAO report—the 2019 edition of GAO's annual report surveying DOD major acquisition programs—stated the following regarding the TAO-205 program:

Technology Maturity and Design Stability

The Navy has matured all Lewis class critical technologies and stabilized the ships' design. In 2014, the Navy identified three critical technologies for the Lewis class, all of which involved a new system for transferring cargo at sea. Prior to initiating detail design activities in June 2016, the Navy completed prototype tests of the critical technologies and found that they were fully mature—an approach consistent with shipbuilding best practices. In 2017, the Navy removed one critical technology—the Heavy e-STREAM cargo delivery system—from the Lewis class design. The Navy had intended to use this system to deliver F-35 Lightning II power modules. The Navy subsequently decided to deliver these by air, which precluded any need for the Heavy system.

Lead ship construction began in September 2018 with 95 percent of the ship's total design effort complete. Program officials stated that this figure meant that 100 percent of the ship's basic and functional design were by then complete—an approach 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. This design was included in the final three Kaiser class oilers.

Production Readiness

The program office has largely kept to its construction schedule to date for the first ship, but a flooding incident at a NASSCO graving dock in July 2018 has affected the delivery of future ships. The program office stated that this incident has not affected current ship fabrication activities. However, the dock's unavailability while repairs are planned and implemented has disrupted the contractor's schedule for future ships. According to the program office, the incident has resulted in some delays to certain delivery dates for ships two through six.

Other Program Issues

As part of the Navy's plan to expand the fleet, the Navy concluded that it would need an additional three Lewis class ships. The Navy's budget request for fiscal year 2019 increased its planned one-ship-per-year buy to two for fiscal years 2019, 2021, and 2023. The Congress provided appropriations for the additional fiscal year 2019 ship in support of the Navy's request. To account for the additional ships in fiscal years 2019 and 2021, the Navy plans to add two more ships to the low-rate initial production phase. Subsequently, program officials stated that they plan to compete a new contract for the remaining 12 ships using the construction knowledge gained from efforts under the existing contract.

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 it continues to follow GAO shipbuilding best practices and has leveraged commercial vessel design practices to minimize risk. The program office also stated that it is currently revising its acquisition baseline to reflect the update in total

quantities to 20 ships. In addition, the program office noted that, in fiscal year 2019, it fully funded the third and fourth ships and funded advance procurement for the fifth ship.[13]

[13] Government Accountability Office, *Weapon Systems Annual Assessment[:] Limited Use of Knowledge-Based Practices Continues to Undercut DOD's Investments*, GAO-19-336SP, May 2019, p. 128.

Appendix B. 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 midocean 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,[14] 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.

[14] 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].[15]

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[15] 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.