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Navy Large Unmanned Surface Vessels (USVs): Background and Issues for Congress

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SUMMARY

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Ronald O'Rourke
Specialist in Naval Affairs

Navy Large Unmanned Surface Vessels (USVs): Background and Issues for Congress

Among the Navy's programs for acquiring unmanned surface vessels (USVs) of various sizes are programs for acquiring large USVs that would be about the size of a large patrol craft, and which would deploy directly from pier rather than from the deck of a crewed Navy warship. Navy plans call for equipping large USVs with weapons and/or sensors or other electronic payloads and operating them in conjunction with crewed Navy ships. In such operations, large USVs would serve as adjunct weapon magazines and/or sensor platforms and thereby help the Navy implement the service's Distributed Maritime Operations (DMO) concept, which calls for spreading the Navy's weapons and sensors across a wider array of ships and aircraft, so as to avoid "putting too many eggs into one basket."

Until 2025, the Navy planned to develop and procure two types of large USVs—Large Unmanned Surface Vessels (LUSVs) and Medium Unmanned Surface Vessels (MUSVs). The LUSV and MUSV programs were a focus of congressional oversight and legislation for several years, particularly regarding the Navy's acquisition strategies for the two programs and technical risk in the programs. Congressional oversight issues included but were not limited to the reliability of USV propulsion machinery for making transoceanic voyages to distant deployment areas, and the maturity of technology for enabling USVs to operate autonomously.

In 2025, the Navy merged the LUSV and MUSV programs into a new program called the Modular Attack Surface Craft (MASC) program. MASCs are to be equipped with containerized weapons and/or sensors or other electronic payloads. Multiple defense contractors—both Navy shipbuilders and other firms—have expressed interest in the MASC program and in some cases are offering USV designs as candidates for the MASC program. Certain elements of the MASC program, including the total number of MASCs that the Navy might want to procure, annual procurement quantities, and the number of firms to be involved in building MASCs, have not yet been announced. Navy ship force structure plans suggest that the Navy might want to procure as many as several dozen MASCs.

An issue for Congress is whether to approve, reject, or modify the Navy's annual funding requests and proposed acquisition strategy for the MASC program. Congress's decisions on this issue could substantially affect Navy capabilities and funding requirements, and the U.S. defense industrial base.

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Introduction

This report provides background information and potential issues for Congress for the Navy's effort to acquire large unmanned surface vessels (USVs). Until 2025, the Navy planned to develop and procure two types of large USVs—Large Unmanned Surface Vessels (LUSVs) and Medium Unmanned Surface Vessels (MUSVs). In 2025, the Navy merged the LUSV and MUSV programs into a new program called the Modular Attack Surface Craft (MASC) program.

An issue for Congress is whether to approve, reject, or modify the Navy's annual funding requests and proposed acquisition strategy for the MASC program. Congress's decisions on this issue could substantially affect Navy capabilities and funding requirements, and the U.S. defense industrial base.

Earlier versions of this CRS report included coverage of Navy plans to procure a large unmanned undersea vehicle (UUV) called the Extra-Large Unmanned Undersea Vehicle (XLUUV) or Orca.[1] In addition to the large USVs covered in this report, the Navy also wants to develop and procure smaller USVs, as well as UUVs and unmanned aerial vehicles (UAVs) of various sizes. Other U.S. military services are developing, procuring, and operating their own types of UVs. Separate CRS reports address some of these efforts.[2]

Background

Navy USVs in General

UVs in the Navy

UVs are one of several new capabilities that the Navy and other U.S. military services are pursuing to meet emerging military challenges, particularly from China. UVs can be equipped with sensors, weapons, or other payloads, and can be operated remotely, semi-autonomously, or (with appropriate technology) autonomously. They can be individually less expensive to procure than manned ships and aircraft because their designs do not need to incorporate spaces and support equipment for onboard human operators. UVs can be particularly suitable for long-duration missions that might tax the physical endurance of onboard human operators, or missions that pose a high risk of injury, death, or capture of onboard human operators—so-called "three D" missions, meaning missions that are dull, dirty, or dangerous.[3]

The Navy has been developing and experimenting with various types of UVs for many years, and has transitioned some of these efforts (particularly those for UAVs) into procurement programs. Some observers have expressed dissatisfaction with what they view as the Navy's slow pace in transitioning UV development efforts into programs for procuring UVs in quantity and integrating them into the operational fleet.

[1] See the March 25, 2025, version or earlier versions of this CRS report.

[2] See, for example, CRS Report R45519, *The Army's Optionally Manned Fighting Vehicle (OMFV) Program: Background and Issues for Congress*, by Andrew Feickert, and CRS In Focus IF11150, *Defense Primer: U.S. Policy on Lethal Autonomous Weapon Systems*, by Kelley M. Sayler.

[3] See, for example, BMT, "An Evolution of the 3 Ds of Robotics: The 6 Ds of Marine Autonomy," BMT, September 11, 2023; "Robots Are Suited for the Dull, Dirty and Dangerous Jobs," *Control Engineering*, October 24, 2019; Bernard Marr, "The 4 Ds Of Robotization: Dull, Dirty, Dangerous And Dear," *Forbes*, October 16, 2017; Bonnie Robinson, "Dull, Dirty, Dangerous Mission? Send in the Robot Vehicle," U.S. Army, August 20, 2015; Ann Diab, "Drones Perform the Dull, Dirty, or Dangerous Work," Tech.co, November 12, 2014.

March 2021 Campaign Framework Document for UVs

On March 16, 2021, the Department of the Navy released a "campaign framework" (i.e., overall strategy) document for developing and acquiring Navy and Marine UVs of various types and integrating them into U.S. naval operations.[4]

Smaller Navy USVs and UUVs

The Navy is developing and procuring smaller USVs and UUVs that can be deployed from manned Navy ships and submarines to extend the operational reach of those ships and submarines. The large USVs covered in this CRS report, in contrast, are to be deployed directly from pier to perform missions that might otherwise be assigned to manned ships and submarines.

Large UVs and Navy Ship Count

Because large USVs (and large UUVs) can be deployed directly from pier to perform missions that might otherwise be assigned to manned ships and submarines, the top-level count of the desired future number of ships in the Navy now increasingly includes multiple figures—one for the desired future number of manned ships and two others for desired future numbers of large USVs and UUVs.

Large UVs and Distributed Maritime Operations (DMO) Concept

Navy plans call for equipping large USVs with weapons and/or sensors or other electronic payloads and operating them in conjunction with crewed Navy ships. In such operations, large USVs would serve as adjunct weapon magazines and/or sensor platforms and thereby help the Navy implement the service's Distributed Maritime Operations (DMO) concept, which calls for spreading the Navy's weapons and sensors across a wider array of ships and aircraft, so as to avoid "putting too many eggs into one basket."[5]

USV Prototypes

Current Navy efforts to acquire large USVs build on earlier USV prototypes and other development work done in part by the DOD's Strategic Capabilities Office (SCO). SCO's effort to develop USVs was called Ghost Fleet, and its LUSV development effort within Ghost Fleet was called Overlord.[6] **Figure 1, Figure 2,** and **Figure 3** show large USV prototypes.

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[4] Department of the Navy, *Department of the Navy Unmanned Campaign Framework*, March 16, 2021, 37 pp. See also Megan Eckstein, "Navy, Marines Unveil How They Will Buy and Operate Future Pilotless Aircraft and Crewless Ships," *USNI News*, March 16, 2021; Gina Harkins, "Why You Should Trust Drone Ships and Unmanned Tech, According to the Navy," *Military.com*, March 16, 2021; Stew Magnuson, "Just In: Navy, Marine Corps Unmanned Framework Calls For 'Capabilities' Over Platforms," *National Defense*, March 16, 2021; Seapower Staff, "Navy, Marine Corps Release Unmanned Campaign Plan," *Seapower*, March 16, 2021; Jordan Wolman, "Looking to the Future of Combat and Competition, Navy Releases Much-Anticipated Campaign Plan on Unmanned Systems," *Inside Defense*, March 16, 2021.

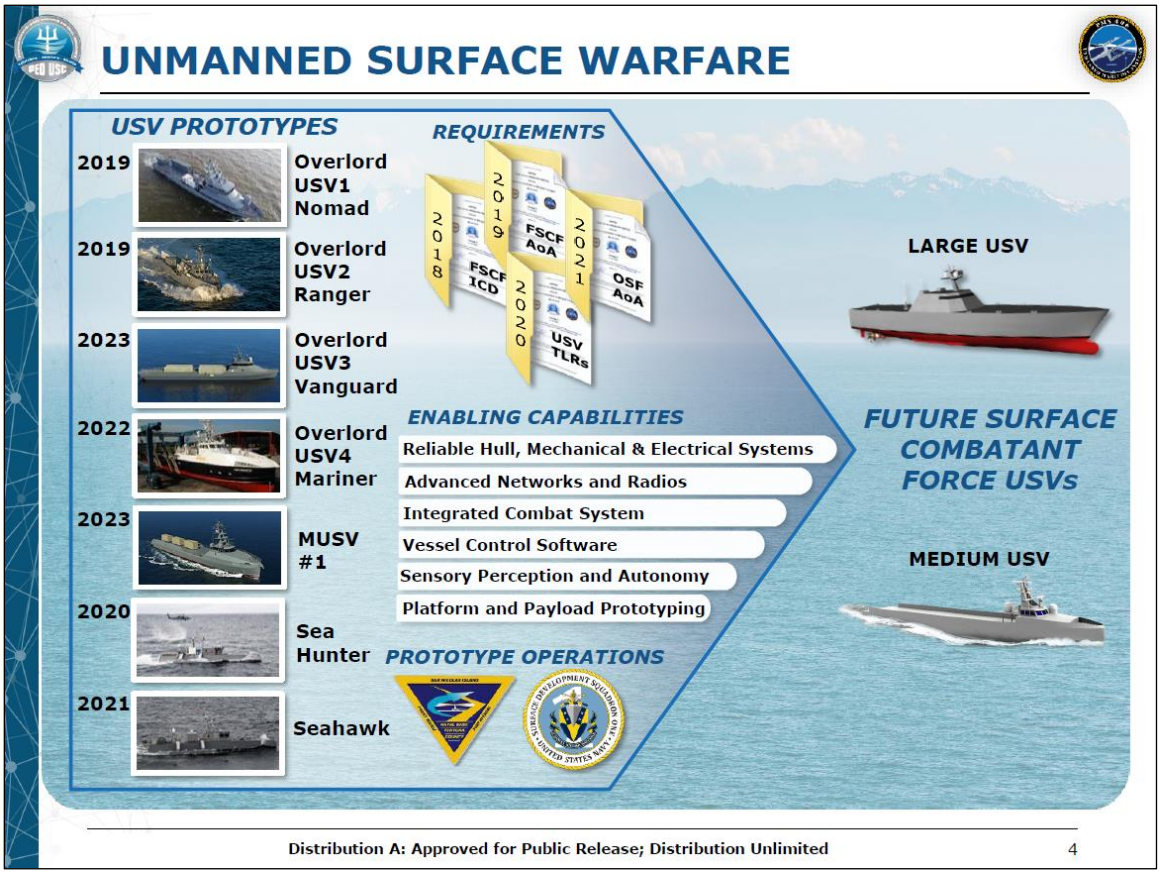
[5] For more on DMO, see CRS In Focus IF12599, *Defense Primer: Navy Distributed Maritime Operations (DMO) Concept*, by Ronald O'Rourke.

[6] A January 12, 2022, press report stated,

> Project Overlord, an experimental unmanned surface vehicle program, has completed its work and has been shut down by the Strategic Capabilities Office, a secretive research and development organization within the Pentagon, a Navy official revealed today.
>
> Its conclusion is a significant milestone, marking a period of transition between the Pentagon's

(continued...)

Figure 1. Large USV Prototypes



Source: Slide 4 of Navy briefing entitled "PMS 406 Maritime Unmanned Systems, CAPT Pete Small," briefing to Surface Navy Association (SNA) annual symposium, January 12, 2022.

research and development enterprise and a complete entry into the Navy's fleet.

Overlord, which produced four vessels in total that will be transferred to the Navy's developmental squadrons, ended in December with a capstone demonstration, Capt. Pete Small, program manager for unmanned maritime systems, told attendees at the Surface Navy Association's national symposium.

"What did we gain out of that?" Small said referring to Project Overlord. "The first thing we gained is the platforms. We're getting those free of charge… It's something on the order of $370 million" over three years invested by the SCO into unmanned vessels.

That includes not just the platforms, but the technology and capabilities held within the ships, such as the control software. With the SCO's activities complete, the Overlord vessels will be transferred to the Surface Warfare Development Squadron this month.

(Justin Katz, "SCO Ends Project Overlord, Shifts Unmanned Vessels to Navy," *Breaking Defense*, January 12, 2022. See also PEO Unmanned and Small Combatants (PEO USC) Public Affairs, "Strategic Capabilities Office Transfers Overlord Unmanned Surface Vessels to U.S. Navy," Naval Sea Systems Command, March 3, 2022.)

Figure 2. Large USV Prototypes

Source: Photograph accompanying Joseph Trevithick, "Crew Optional Designs Could Be Barred By Law From Navy's Drone Ship Program," *The War Zone*, December 10, 2025. The caption to the photograph credits the photograph to the Navy.

Figure 3. Large USV Prototypes

Source: Photograph from briefing slide entitled "UMS [unmanned maritime systems] at Sea," slide 4 of 5 (including cover slide) of Navy briefing entitled "PMS 406 Unmanned Maritime Systems," Program Overview, August 2021, prepared for Sea-Air-Space Exposition. The briefing slide states that the photograph shows "Overlord USVs Ranger & Nomad on the West Coast."

MASC Program

Overview

Until 2025, the Navy planned to develop and procure two types of large USVs—Large Unmanned Surface Vessels (LUSVs) and Medium Unmanned Surface Vessels (MUSVs). The LUSV and MUSV programs were a focus of congressional oversight and legislation for several years, particularly regarding the Navy's acquisition strategies for the two programs and technical risk in the programs. Congressional oversight issues included but were not limited to the reliability of USV propulsion machinery for making transoceanic voyages to distant deployment areas, and the maturity of technology for enabling USVs to operate autonomously.[7]

In 2025, the Navy merged the LUSV and MUSV programs into a new program called the Modular Attack Surface Craft (MASC) program.[8] Multiple defense contractors—both Navy shipbuilders and other firms—have expressed interest in the MASC and in some cases are offering USV designs as candidates for the MASC program. Certain elements of the MASC program, including the total number of MASCs that the Navy might want to procure, annual procurement quantities, and the number of firms to be involved in building MASCs, have not yet been announced. Navy ship force structure plans suggest that the Navy might want to procure as many as several dozen MASCs.

FY2026 Budget Submission

The Navy's FY2026 budget submission states:

> In FY 2026, the MASC program will conduct a prototyping phase with industry in order to mature and development unmanned technologies, as well as demonstrate unmanned capability to reduce risk for future MASC procurement….
>
> While USVs are new additions to the fleet, MASC is intended to combine robust and proven commercial vessel specifications with existing military payloads to rapidly and affordably expand the capacity and capability of the surface fleet….
>
> MASC, the future USV, is defined as having a reconfigurable mission capability, accomplished via modular payloads with an initial capability to support Battlespace Awareness through supporting Intelligence, Surveillance, Reconnaissance, and Targeting (ISR-&T), Counter-ISR&T (CISR&T), and Information Operations (IO) mission areas. Modular payloads may be developed separately by other programs or prototyping efforts and will be further developed and/or integrated into MASC Block 0 and Block 1 under the USV Enabling Capabilities [line item, which is PE [Program Element] (0605513N) [in the Navy's research and development account]….
>
> MASC will support the Navy's ability to produce, deploy and disburse ISR&T/C-ISR&T/IO capabilities in sufficient quantities and provide/improve distributed situational awareness in maritime Areas of Responsibility (AORs). These USVs will be capable of weeks-long deployments and trans-oceanic transits and can operate aggregated with Carrier Strike Groups (CSGs) and Surface Action Groups (SAGs), as well as independently. These USVs will be a key enabler of the Navy's Distributed Maritime Operations (DMO) concept….

[7] For detailed discussion of the LUSV and MUSV programs, see the March 25, 2025, version of this CRS report.

[8] For a press report in January 2025 about the then-forthcoming shift from the LUSV and MUSV programs to what became the MASC program, see Hope Hodge Seck, "Navy To Simplify Drone Ship Plans, Focus On Containerized Payloads That Look Alike," *The War Zone*, January 17, 2025.

> The Sea Hunter and Seahawk prototypes are experimentation vessels operated by PMS 406 [the Navy's Program Executive Office for Unmanned Maritime Systems] and the Navy's Surface Development Squadron, and are currently homeported in San Diego, CA. Seahawk was delivered to ONR [Office of Naval Research] who subsequently transferred ownership to PMS 406 Q3 FY21. [The] No Manning Required Ship (NOMARS) is planned to transition from DARPA [[the Defense Advanced Projects Research Agency] to PMS 406 in FY26. This vessel will help feed the future MASC PoR [program of record] and will provide risk reduction and technology maturation through testing of equipment and tactics. Through continued operations and demonstrations utilizing prototypes, the Navy continues to gain valuable insights and lessons learned in the utilization of unmanned systems and their associated payloads. This knowledge influences both Concept of Operation/ Employment doctrine to guide fleet operations, as well as requirements documents for the MASC program….
>
> The prototyping efforts with the MUSV hardware and software will inform decisions in preparation for development of the MASC program. Formalized requirements will be defined through a Capability Development Document and procurement funding will be developed as part of a decision in future budgets. The USV prototypes, to include NOMARS, which will transition to PMS 406 in FY26, will be used for technology maturation and risk reduction efforts in support of the MASC PoR.[9]

July 2025 Navy Solicitation Seeking Industry Input

A July 31, 2025, news release from the Naval Sea Systems Command (or NAVSEA—the Navy's ship acquisition command) states:

> The U.S. Navy released a solicitation seeking industry input in support of the Modular Attack Surface Craft (MASC) program, [on] July 28 [2025]. The solicitation, open until August 11 [2025], invites industry partners to submit white papers or slide decks outlining their capabilities and proposed solutions for the MASC program.
>
> The program will utilize an innovative acquisition approach—leveraging Other Transaction Agreements, a flexible and streamlined acquisition tool—to emphasize rapid deployment and cost-effectiveness through commercial off-the-shelf technology and incremental development phases. Utilizing existing commercial designs and production capabilities will enable the Navy to rapidly deploy a formidable and cost-effective USV force.
>
> "The MASC program represents a significant step forward in the Navy's pursuit of a robust and adaptable unmanned surface fleet," said Capt. Matthew Lewis, program manager of the Unmanned Maritime Systems program office. "This innovative approach to acquisition, coupled with a modular design philosophy, will provide the fleet with cost-effective and highly capable platforms to address the challenges of the 21st-century maritime environment."
>
> MASC combines essential capabilities from the Navy's Medium and Large Unmanned Surface Vessel (USV) programs, merging them into a flexible, modular platform designed for multi-mission operations. This will enhance the Navy's distributed lethality and battlespace awareness through embarked warfighting capabilities including anti-surface warfare, strike warfare and information operations in addition to future embarked mission areas.
>
> "By uniting advanced modular design with rapid, cost-effective acquisition strategies, MASC will transform our surface fleet's capabilities—enabling distributed lethality and

[9] Department of Defense, *Department of Defense Fiscal Year (FY) 2026 Budget Estimates, Navy [Budget] Justification Book, Volume 2 of 5, Research, Development, Test & Evaluation, Navy, Budget Activity 4*, June 2025, pp. 24, 1468-1469, 1473 (PDF pages 98, 1542-1543, 1547 of 1690).

> enhanced battlespace awareness across multiple mission domains," said Melissa Kirkendall, acting Program Executive Officer, Unmanned and Small Combatants (PEO USC). "We encourage industry partners to engage with this transformative initiative and collaborate with us to shape the future of unmanned maritime operations."
>
> The development of MASC answers the call to adapt to evolving geopolitical and technological challenges. MASC will bolster the Navy's ability to operate in contested environments, ensuring a more distributed and resilient force posture and significantly enhancing the Navy's combat effectiveness.[10]

The Navy's July 28, 2025, solicitation states:

> The Navy is pleased to announce the Modular Attack Surface Craft (MASC) program, which seeks Unmanned Surface Vessels (USV) to address several key operational needs. MASC seeks to leverage cutting-edge technologies and modular design principles to create adaptable and resilient solutions that can effectively counter evolving threats. We invite interested parties with expertise in innovative solutions to complex problems, vessel construction, autonomy, perception systems and general maritime experience to participate in this exciting opportunity.
>
> To accelerate the design, development and demonstration of MASC capabilities, the Navy will be utilizing the Other Transaction Authority pathway as outlined in Title 10 U.S.C. § 4022. It is intended that this solicitation will result in the award(s) of prototype projects, which may include not only commercially-available technologies fueled by commercial or strategic investment, but also concept demonstrations, pilots, and agile development activities that can incrementally improve commercial technologies, existing Government-owned capabilities, or concepts for defense application. The initial effort will focus on the relevance, technical merit, feasibility, and affordability of the proposed vessel solutions.[11]

An Area of Interest (AOI) document that was attached to the Navy's July 28, 2025, solicitation provides additional details about the MASC program. The text of the document is presented in **Appendix**.

Press Reports

Press reports about the Navy's July 28, 2025, solicitation discussed certain details included in the solicitation. A July 31, 2025, press report, for example, states that

> [t]he MASC contracting notice that NAVSEA put out this week calls for three designs—a baseline version, as well as high-capacity and single-payload types—the requirements for which are all based around payload capacity, range, and speed, rather than length and/or displacement….
>
> NAVSEA says it is also highly desirable that contractors be able to produce any MASC USV designs quickly, hopefully in less than 18 months from an initial contract award….
>
> Designs built to commercial standards, that are readily repairable, and that can be maintained using predictive models, are also strongly desirable, according to NAVSEA….
>
> The weapons payload in question seems all but certain to be the Mk 70 Expeditionary Launcher, also known as Payload Delivery System. This is a containerized derivative of

[10] Program Executive Office Unmanned and Small Combatants Public Affairs, "U.S. Navy Seeks Industry Feedback for Modular Attack Surface Craft Program," Naval Sea Systems Command, news release dated July 31, 2025.

[11] "Modular Attack Surface Craft (MASC)- Solicitation," SAM.gov, July 28 (updated July 31), 2025, accessed January 14, 2026, at https://sam.gov/opp/8b9b32c898a64ddc9d7dcd3d208cfb0e/view.

> the Mk 41 Vertical Launch System (VLS) with four cells capable of firing various missiles, including Standard Missile-6s (SM-6) and Tomahawks.[12]

A September 2, 2025, press report states that MASC is

> envisioned to carry a variety of payloads and be easy to build and repair en masse. Beyond that, however, the Navy was intentional in not overly prescribing requirements about what this new vessel should look like, but rather asked defense firms to offer them the right solution to fill the service's needs….
>
> For MASC, the Navy is taking a page out of the playbook of the Defense Innovation Unit, the Pentagon agency known for connecting the military to Silicon Valley. DIU strips back overly prescriptive requirements in lieu of a narrative explanation of the problem and gives a broad outline of its desired solutions….
>
> MASC is a marked step in a different direction from the service's previous visions for its future hybrid fleet. At the top of the Navy's priorities is a vessel that is "non-exquisite," adheres to commercial standards and will be easy to build and repair in large numbers.
>
> Assuming the necessary funding is approved by Pentagon brass and lawmakers—not a surefire thing with any Pentagon program—the service will assess proposals and have detailed discussions with vendors over the next several months, which could lead to a prototype production contract in early fiscal 2026, according to [Captain Matthew Lewis, the program manager for the office overseeing the Navy's unmanned systems portfolio].[13]

Provisions in FY2026 NDAA

In the FY2026 National Defense Authorization Act (NDAA) (S. 1071/P.L. 119-60 of December 18, 2025), Section 130 states:

> SEC. 130. LIMITATION ON CONSTRUCTION OF MODULAR ATTACK SURFACE CRAFT.
>
> The Secretary of the Navy may not enter into a contract or other agreement that includes a scope of work, including priced or unpriced options, for the construction, advance procurement, or long-lead material for Modular Attack Surface Craft Block 0 until the Secretary certifies to the congressional defense committees that such vessels will be purpose-built unmanned vessels engineered to operate without human support systems or operational requirements intended for crewed vessels.[14]

Section 122 states:

> SEC. 122. MODIFICATION TO LIMITATIONS ON NAVY MEDIUM AND LARGE UNMANNED SURFACE VESSELS.
>
> (a) REPEAL.—Section 122 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (Public Law 116–283; 134 Stat. 3425) is repealed.[15]

[12] Joseph Trevithick, "Navy Unmasks Its Vision For Fleet Of Uncrewed Modular Surface Attack Craft," *The War Zone*, July 31, 2025. See also Justin Katz, "Navy Looks for Ideas to 'Swiftly Prototype' New USVs," *Breaking Defense*, July 28, 2025; Aaron-Matthew Lariosa, "Navy Seeks New Fast Attack Surface Drone Design," *USNI News*, July 28, 2025; Abby Shepherd, "Navy Seeks Several Solutions for MASC, Asks for White Papers," *Inside Defense*, July 28, 2025; Rojoef Manuel, "US Navy Eyes New Class of Autonomous Ships to Haul Containerized Cargo," *DefensePost*, August 5, 2025.

[13] Justin Katz, "'Be Uncomfortable': Navy Wants New USV to Challenge the 'Status quo,'" *Breaking Defense*, September 2, 2025.

[14] For an article discussing this provision, see Joseph Trevithick, "Crew Optional Designs Could Be Barred By Law From Navy's Drone Ship Program," *The War Zone*, December 10, 2025.

[15] Section 122 of P.L. 116-283 placed certain limitations on the Navy's LUSV and MUSV programs.

(b) REQUIREMENT.—The Secretary of the Navy may not award a detail design or construction contract or other agreement, or obligate funds from a procurement account, for a covered program unless such contract or other agreement includes a requirement for an operational demonstration of not less than 720 continuous hours without preventative maintenance, corrective maintenance, emergent repair, or any other form of repair or maintenance, on any of the following:

(1) The main propulsion system, including the fuel and lube oil systems.

(2) The electrical generation and distribution system.

(c) CERTIFICATION.—The Secretary of the Navy may not accept delivery of articles constructed under a contract or other agreement for a covered program until the Secretary certifies to the congressional defense committees that the operational demonstration described in subsection (b) has been successfully completed.

(d) LIMITATION.—The Secretary of the Navy may not make contract financing payments for a contract or other agreement entered into for a covered program greater than 90 percent for small businesses and 80 percent for all other businesses until the certification described in subsection (c) is submitted.

(e) DEFINITIONS.—In this section:

(1) COVERED PROGRAM.—The term "covered program" means a program for—

(A) medium unmanned surface vessels; or

(B) large unmanned surface vessels.

(2) OPERATIONAL DEMONSTRATION.—The term "operational demonstration" means a land-based or sea-based test of the systems concerned in vessel-representative form, fit, and function.

Industry Interest

On June 17, 2025, the Navy held an industry day for what it referred to at the time as its Future USV.[16] Multiple defense contractors—both Navy shipbuilders and other firms—have expressed interest in the MASC program and in some cases are offering USV designs as candidates for the MASC program.[17]

Issues for Congress

Potential oversight issues for Congress regarding the MASC program include but are not necessarily limited to

[16] See "Future Unmanned Surface Vessel (USV) Industry Day," SAM.gov, May 16, 2025, accessed January 14, 2026, at https://sam.gov/opp/55219aab20d0437390ec7da6a58c9996/view; John Harper, "Navy to brief industry on plans for new robotic ship program," *DefenseScoop*, May 19, 2025.

[17] For press reports discussing some of these firms and their USV designs, see, for example, Joseph Trevithick, "Crew Optional Designs Could Be Barred By Law From Navy's Drone Ship Program," *The War Zone*, December 10, 2025; Justin Katz, "Anduril, Hyundai Heavy Industries Set Sights on US Navy's Unmanned Surface Vessel Program," *Breaking Defense*, November 13, 2025; Lauren C. Williams, "Anduril to Build Autonomous Vessel Prototype in Korea," *Defense One*, November 13, 2025; Rich Abott, "Leidos Stays Mum During Navy MASC USV Review, But Combining Sea Hunter And Overlord USVs," *Defense Daily*, September 11, 2025; Rich Abott, "Flurry Of Companies Publicize Navy MUSV Options," *Defense Daily*, September 10, 2025; Nick Wilson, "Eureka Naval Craft Proposing USV Design for Navy's MASC," *Inside Defense*, September 10, 2025; Justin Katz, "'Be Uncomfortable': Navy Wants New USV to Challenge the 'Status quo,'" *Breaking Defense*, September 2, 2025; Justin Katz, "'Oversaturated': Can the Navy Make Good on Unmanned Vessel Demand after Industry Surge?" *Breaking Defense*, June 17, 2025.

- the Navy's concept of operations (CONOPS) for using MASCs;[18]
- the Navy's acquisition strategy for developing and procuring MASCs;
- program-execution risk, meaning the risk of cost growth, schedule slippage, or technical problems;
- the potential implications of the MASC program for the U.S. industrial base; and
- the potential implications of large USVs such as MASC for miscalculation or escalation at sea. [19]

[18] A CONOPS is a detailed understanding of how a military asset will be used in one or more operational settings. Some observers have raised questions regarding the Navy's CONOPs for operating and supporting large UVs, particularly large USVs. (See, for example, Manal Cheema and Ariel Sarandinaki, "The Warship's Remote Operator: Who Is the Captain Now?" Lawfare, April 15, 2024; Jonathan Panter and Johnathan Falcone, "The Unplanned Costs of an Unmanned Fleet," *War on the Rocks*, December 28, 2021; Gregory V. Cox, "The U.S. Navy's Plans for Unmanned and Autonomous Systems Leave Too Much Unexplained," *War on the Rocks*, December 10, 2021.)

[19] Some observers have expressed concern regarding the potential implications of large UVs, particularly large USVs, for the chance of miscalculation or escalation in when U.S. Navy forces are operating in waters near potential adversaries. See, for example, Jonathan Panter, "Naval Escalation in an Unmanned Context," Center for International maritime Security (CIMSEC), April 26, 2023; David Axe, "Autonomous Navies Could Make War More Likely," *National Interest*, August 17, 2020; David B. Larter, "The US Navy Says It's Doing Its Best to Avoid a 'Terminator' Scenario in Quest for Autonomous Weapons," *Defense News*, September 12, 2019; Evan Karlik, "US-China Tensions—Unmanned Military Craft Raise Risk of War," *Nikkei Asian Review*, June 28, 2019. See also Thomas Shugart, "Uncrewed But Confident: Forging New Rules of the Road to Avoid Accidental Escalation," *War on the Rocks*, May 1, 2024; Thomas Shugart, *Autonomy and International Stability: Confidence-Building Measures for Uncrewed Systems in the Indo-Pacific*, Center for a New American Security (CNAS), March 2024, 27 pp.; *Impact of Unmanned Systems to Escalation Dynamics*, Center for Naval Analyses (CNA), undated, 2 pp. (summary of a longer CNA report; includes a reference to "near-term unmanned systems (2017-2025)").

Appendix. Navy Solicitation Area of Interest (AOI) Document

This appendix presents the text of an Area of Interest (AOI) document that was attached to the Navy's July 28, 2025, solicitation for the MASC program. The text is as follows:

Exhibit A: Prototype MASC Area of Interest (AOI)

Problem Statement:

The U.S. Navy seeks unmanned surface vessels (USV) to address several key operational needs. PMS 406 [the Navy's Program Executive Office for Unmanned Maritime Systems] will address these operational needs via containerized payload solutions. The purpose of the USVs is to provide the autonomous carrying capacity for those payloads.

Proposed Technology Solutions:

This AOI offers industry the opportunity to propose vessel solutions for distinct problem sets. Each proposed vessel solution enables the Navy to meet a different operational need. Solutions should be sufficiently mature. The Navy desires vessel solutions that will address up to three (3) operational needs with each vessel providing a non-exquisite solution. Please refer to the "Submission Requirements" section before submitting your solution white paper.

Vessel Solution Descriptions:

The vessel solution information depicts the threshold payload and range/speed values to address the Navy operational needs. Technology solutions must accommodate containerized payloads as defined below. The following vessel solution descriptions are prioritized in order of operational importance to the Navy.

Vessel Solution 1: Modular Attack Surface Craft (MASC)

The Navy seeks to address the need for a fast, high capacity, embarked payloads platform, which integrates with International Organization for Standardization (ISO) containerized payloads. The desired vessel solution should carry a minimum of two forty-foot equivalent unit (FEU) containerized payloads that weigh 36.3 metric tons (MT) each and consume up to 75 kilowatts (kW) each. While carrying 25 MT on the payload deck, the vessel should achieve a minimum range of 2,500 nautical miles (nmi) while maintaining at least 25 knots, at all times, in NATO Sea State 4.

Vessel Solution 2: High-Capacity MASC

The Navy seeks to address the need for a high endurance, high capacity, embarked payloads platform, which integrates with ISO containerized payloads. The desired vessel solution should have the ability to carry a minimum of four (4) FEUs containerized payloads that weigh 36.3 MT each and consume up to 50 kW each.

The technology solution should maximize speed and range to the extent practicable.

Vessel Solution 3: Single Payload MASC

The Navy seeks to address the need for an embarked payload platform, which integrates with ISO containerized payloads. The desired vessel solution should have the ability to carry a minimum of one (1) twenty-foot equivalent unit (TEU) containerized payloads that weigh 24.0 MT and consume up to 75 kW. The TEU payload should have no obstructions aft of the payload to the transom. The technology solution should maximize speed and range to the extent practicable.

Proposed Vessel Solutions

The Department intends to swiftly prototype and demonstrate one or more MASC USVs capable of embarking containerized payloads. This prototype will seamlessly maneuver with other Navy surface vessels or operate independently. The objective is for a non-exquisite vessel design that maximize use of commercial standards to allow construction and repair at multiple shipyards. The desired solution will provide a complete prototype of the vessel, including autonomy software, perception systems, command and control (C2), hull machinery and electrical (HM&E) systems, and external communications. C2 of vessels will be located at an off-hull operating station either ashore or embarked on another vessel. Producibility, readiness, and the ability to scale up production are key aspects of the proposed vessel solution.

MASC Vessel Solution Attributes:

The Navy desired attributes are applicable to all vessel solutions, unless otherwise noted. Companies should identify the maximum continuous operating and survival conditions for each vessel solution.

Primary (highly desired) attributes:

- Vessel readiness: Of high importance is the readiness and ability to construct and field a vessel rapidly (less than 18 months from prototype OT award). Submissions should include information on current and projected production facilities, throughput, and capacity balanced with required workforce and hiring plan if required, and any projected expansion and capital investment.
- Interoperability: Interfaces between C2 and Autonomy system are documented via Interface Control Documentation (ICDs).
- Autonomous maneuver: Autonomously and safely avoid maritime hazards and collisions with vessels, including during low visibility conditions and in scenarios where radio frequency (RF) emissions are not permitted. The vessel should be able to safely continue the mission if communications with the control station are lost. These maneuvers are compliant with COLREGS,[20] and the vessel can classify contacts in accordance with COLREGS autonomously.
- Payload access: Payload(s) is(are) unobstructed from the topside of the containerized payload to the port, starboard, aft, and overhead.
- Software architecture: Autonomy, perception, and C2 software conform to a documented open architecture standard.

Secondary (strongly desired) attributes:

- Commercial construction: Vessels are constructed to an American Bureau of Shipping (ABS) standard.
- Radiofrequency (RF) emissions controls: Automatically adjust RF emission control posture based on the mission requirements sent to the platform via offboard control station.
- Interior payload: The vessel interior should include a climate controlled and secure space for future electronics.
- Open-ocean performance: Vessel is capable of autonomously operating in sea state 5 at a wide range of speeds and headings, using NATO standard for sea state.

[20] This is a reference to an October 1972 multilateral convention on international regulations for preventing collisions at sea, commonly known as the collision regulations (COLREGs) or the "rules of the road." For more on COLREGS, see CRS Report R42784, *U.S.-China Strategic Competition in South and East China Seas: Background and Issues for Congress*, by Ronald O'Rourke.

- Vessel performance: Speed and ranges to support oceanic voyages, with higher speed and range preferred. This information will be reported in NATO sea state 4 with maximum payload loading conditions.
- Reliability & maintainability engineering: Vessels are rapidly repairable and maintenance is predictive. Extended operation times without preventative maintenance, corrective maintenance, emergent repair or any other form of repair or maintenance are desired.
- Software architecture: The autonomous solution shall implement nonproprietary, machine-readable interfaces to enable third-party integration, modular upgrades, and component-level interoperability without reliance on proprietary standards.
- Vessel C2: C2 provides a logical user interface capable of controlling multiple USVs simultaneously from a single control station.

Tertiary (other desired) attributes:

- Foreign military sales (FMS): Ease of export to U.S. allies and partners in accordance with International Traffic in Arms Regulations (ITAR) and other exportability statutes and regulations.
- Commercial compliance: Vessel meets ABS requirements and company intends to provide initial ABS class of any constructed vessel with exceptions for the unmanned/autonomous nature of the vessel.
- Payload support: Vessel can provide 125 kW per containerized payload.
- Accommodations: Organic accommodations onboard for eight (8) personnel for up to 14 days. This desired attribute is not applicable to vessel solution 3.

Prior Demonstration and Fielding

Preference may be given to companies that can provide evidence demonstrating capability in relevant and/or representative environments and show experience in successfully fielding vessel and software solutions. This includes demonstrating successful integration of autonomous solutions to marine surface vessels and production of comparable surface vessels. Solution briefs should indicate to what extent attributes and performance listed in the brief has been verified (e.g. on water testing, hardware-in-the-loop testing, modelling and simulation, analysis, etc.).

It is encouraged that submissions highlight experience with controlled environments, such as deployments in classified data/environments. Preference may be given to systems whose solutions have successfully achieved an Authority to Operate (ATO) or similar government cybersecurity authorization.

Vessel Construction

It is desired that any vessel construction, including major component(s) of the hull or super structure of any such vessel, funded by this action will be completed at a shipyard in the United States and all future production plans will use U.S. facilities for construction. Each company, in the construction of the design solution, should, whenever possible procure goods, products, materials, and services from US sources in accordance with the Buy American Act.

Author Information

Ronald O'Rourke
Specialist in Naval Affairs

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