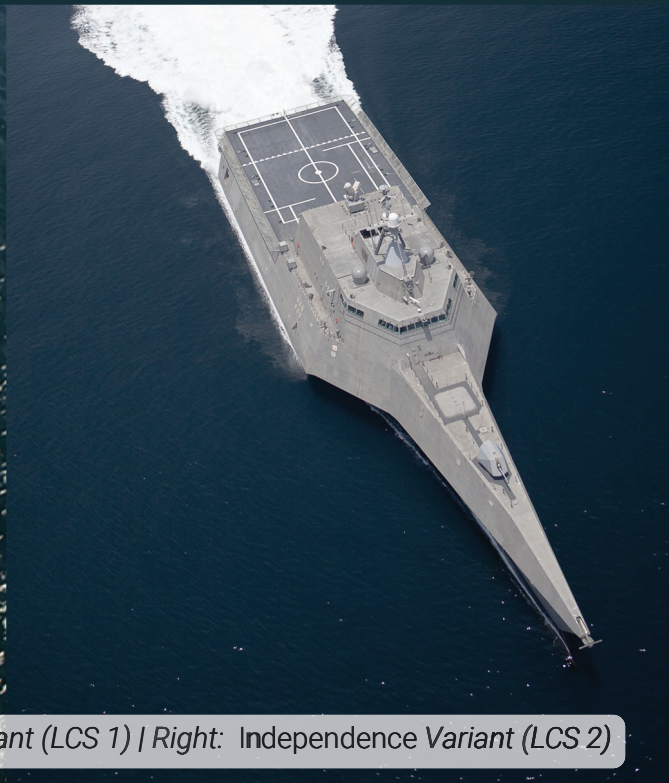


Littoral Combat Ship (LCS)



Left: Freedom Variant (LCS 1) | Right: Independence Variant (LCS 2)

In August 2022, the Navy commenced IOT&E of the Littoral Combat Ship (LCS) Mine Countermeasure (MCM) Mission Package (MP) and scheduled completion of the remaining LCS MCM MP operational test events in FY23. In February 2022 and August 2022, the Navy conducted cyber survivability testing of the LCS Surface Warfare (SUW) MP Increment 3. DOT&E released the LCS SUW MP Increment 3 IOT&E report in May 2022 with an update for cyber survivability expected in 2QFY23. The President’s Budget 2023 includes a complete divestment of the LCS Anti-Submarine Warfare (ASW) MP, initiating a Nunn-McCurdy breach of the LCS MCM and SUW MP programs.

SYSTEM DESCRIPTION

The LCS is a small surface combatant designed for littoral

operations, but also capable of executing open ocean missions. The LCS comprises two seaframe variants: the *Freedom* variant and the *Independence* variant. The *Freedom* variant is a mono-

hull design constructed of steel (hull) and aluminum (deckhouse) with two steerable and two fixed-boost waterjets driven by a combined diesel and gas turbine main propulsion system.

The *Independence* variant is an aluminum trimaran with two steerable waterjets driven by diesel engines and two steerable waterjets driven by gas turbine engines. LCS seaframes host and derive mission capability from the SUW and MCM MPs.

The SUW MP derives capability from the following components:

- Two Mk 46 30mm guns
- MH-60R or MH-60S helicopter
- MQ-8 Fire Scout unmanned air vehicle
- Two 11-meter rigid-hull inflatable boats
- Surface-to-Surface Missile Module with 24 Longbow Hellfire missiles

The MCM MP derives capability from the following baseline components:

- AN/ASQ-235 Airborne Laser Mine Detection System (ALMDS)
- AN/AQS-20C Minehunt
- Airborne Mine Neutralization System (AMNS)
- Unmanned Influence Sweep System

The MCM MP will incorporate the following systems pending continued system development:

- Knifefish Block I unmanned undersea vehicle
- AN/DVS-1 Coastal Battlefield Reconnaissance and Analysis Block II
- Barracuda Mine Neutralization System

MISSION

The Maritime Component Commander will employ LCS to conduct MCM or SUW tasks based upon the MP installed in the seaframe. Because of capabilities inherent to the seaframe, commanders can employ LCS in a maritime presence role with either MP and support deterrence operations. In addition, with the Maritime Security Module installed as part of the SUW MP, the ship can conduct Maritime Security Operations including visit, board, search, and seizure of ships suspected of transporting contraband.

The Navy employs LCS alone, or within a group of ships, to prepare the environment for joint forces access to littoral regions by conducting MCM and SUW operations, possibly under an air defense umbrella.

PROGRAM

The LCS seaframes and the combined MPs are each Acquisition Category IC programs. Further, several components within the MPs are individual programs of record themselves. In 2018, DOT&E approved an update to the LCS Test and Evaluation Master Plan (TEMP) that accounted for changes in the test design to evaluate the MPs on the two seaframe variants.

The President's Budget 2023 included a complete divestment of the LCS ASW MP. The Navy originally planned to purchase

11 ASW MPs, but the Navy now contends that changes in threat capabilities and limitations in space, weight, and power on the LCS variants no longer support the continued development of the ASW MP. This divestment of the ASW MP triggered a significant Nunn-McCurdy breach due to the reduction of the aggregate MPs procured. The reduction results in a 37.3 percent increase to the cost of the remaining MPs, exceeding the 30 percent threshold for a significant Nunn-McCurdy breach.

The Navy intended to make an update to the TEMP in FY21 to account for additional changes in the test program for the MCM MP. However, the Navy now intends to deliver the update for DOT&E approval in FY23 and include the ASW MP divestment. Additionally, the Navy expects to provide the TEMP for the MCM Unmanned Surface Vehicle (USV) with Minehunt payload to DOT&E for approval in 1QFY23.

» MAJOR CONTRACTORS

- Lockheed Martin and Fincantieri Marinette Marine – Marinette, Wisconsin
- Austal USA – Mobile, Alabama
- Northrup Grumman – Falls Church, Virginia

TEST ADEQUACY

In August 2022, the Navy conducted operational test of the LCS MCM MP from the USS *Cincinnati* (LCS 20) in the Southern California Operating

Areas. The Navy evaluated the capability of the LCS MCM MP to execute mine clearance missions against threat-representative mine surrogates. Testing was sufficient to demonstrate coordinated command and control of the baseline capabilities of the MCM MP. The Navy further conducted IOT&E of the MCM USV with the Minehunt payload in conjunction with these test events of the LCS MCM MP. Tests were in accordance with DOT&E-approved test plans, and observed by DOT&E.

In February 2022 and August 2022, the Navy conducted the cooperative vulnerability and penetration assessment and the adversarial assessment to evaluate the cyber survivability of LCS SUW MP Increment 3. Testing was in accordance with a DOT&E-approved test plan and observed by DOT&E. Additionally, the Navy scheduled evaluation of the cyber survivability of the LCS MCM MP in FY23.

The Navy fielded the AMNS and ALMDS components of the MCM MP in 2016 without conducting IOT&E for either component. Limited testing of these two components are included in the August 2022 IOT&E for the LCS MCM MP. As such, insufficient data are available from operational tests to characterize the performance of these components or their

contribution to the LCS MCM MP effectiveness. DOT&E is working with the Navy to identify representative performance data of these components from fleet training and certification events. Should insufficient data exist to characterize the performance of these components, testing of the LCS MCM MP will not be adequate to assess operational effectiveness. The Navy is evaluating options for additional test should this be the case.

PERFORMANCE

» EFFECTIVENESS

Insufficient data are available to assess operational effectiveness of the LCS MCM MP. No preliminary assessment of performance metrics are available as analysis remains in progress.

» SUITABILITY

Insufficient data are available to assess operational suitability of the LCS MCM MP. No preliminary assessment of suitability metrics are available as analysis remains in progress.

» SURVIVABILITY

The Navy completed the LFT&E survivability assessment of the LCS seaframes in FY19. LFT&E

analysis highlighted several LCS design features that drive survivability performance of each variant against selected kinetic threat categories.

Analysis of the data from the LCS SUW MP cyber survivability assessments is in progress with a DOT&E report expected in 2QFY23. Insufficient data are available to assess the cyber survivability for the LCS MCM MP.

RECOMMENDATIONS

The Navy should:

1. Complete operational testing of the LCS MCM MP and MCM USV with Minehunt payload.
2. If insufficient data are available to characterize the performance of ALMDS and AMNS, plan additional test to obtain these data, as data are required to adequately test the LCS MCM MP capability.
3. Submit an update to the LCS MP TEMP for DOT&E approval as soon as feasible and that reflects the current MCM MP test strategy.
4. Submit the MCM USV with Minehunt payload TEMP for DOT&E approval as soon as feasible.