

Tomahawk Weapon System (TWS)



In FY24, the Navy completed an operational assessment of Tomahawk Weapon System (TWS) upgrades to the Theater Mission Planning Center (TMPC) and the Tactical Tomahawk Weapon Control System (TTWCS). DOT&E anticipates submitting an FOT&E report in 2QFY25. Maritime Strike Tomahawk (MST), a subprogram of TWS, conducted no operational tests or LFT&E in FY24. The Navy conducted some Joint Multi-Effects Warhead System (JMEWS) testing in FY24.

SYSTEM DESCRIPTION

The TWS consists of three segments intended to provide surface combatants and submarines with long-range, precision-guided, land attack cruise missile capability. The three major components of the system include the all-up round (AUR) missile, the TTWCS, and the TMPC.

- AUR: Block IV and Block V AURs are conventional Tomahawk missiles with surface and submarine vertical launch capabilities and ground launch capabilities with the U.S. Marine Corps and U.S. Army.
- TTWCS: Provides operator interface to employ the Tomahawk missile.
- TMPC: A shore-based or sea-based mission planning center that provides maritime component commanders the capability to plan, modify and distribute TWS missions.

The MST, currently in development, intends to integrate a maritime seeker into a Block V AUR, designated variant Va. The JMEWS integrates a new multi-stage, insensitive munitions-compliant, warhead into a Block V AUR, designated variant Vb.

MISSION

The joint force commander employs naval units equipped with the TWS for long-range, precision strikes against land targets. MST upgrades are

designed to enable the joint force commander to employ the TWS in anti-surface warfare.

PROGRAM

The TWS is an Acquisition Category (ACAT) IC program. The Block V variant completed operational testing in 2021 and is detailed in the classified TWS FOT&E report of October 2021. DOT&E approved Revision I of the TWS TEMP 251-4 in May 2023 to evaluate hardware and software modifications to the TTWCS (TTWCS v5.6.1) and the TMPC (TMPC 6.0.2/7.0.X).

- TTWCS v5.6.1 upgrades support future AUR changes and GPS Military Code (M-code) capability, as well as SSN *Virginia*-class Payload Module implementation.
- TMPC 6.0.0/7.0.x supports AUR land attack capability changes.

The Navy transitioned the MST from the rapid deployment capability acquisition pathway to a subprogram of the TWS program in April 2023. The resultant Block Va variant effort will add a surface warfare capability to the legacy TWS Block V. Contributing to this decision to transition pathways were delays in system development and production, and congressional marks in FY21 and FY22. The Navy has evaluated warhead fuzing and target impact in accordance with the DOT&E-approved LFT&E Strategy but has yet to evaluate warhead lethality against threat-representative ships. The Navy has yet to

develop program requirements for MST or provide a TEMP update to DOT&E for approval that includes evaluation of MST.

DOT&E approved the JMEWS LFT&E Strategy in January 2021. The JMEWS, an ACAT III program, is scheduled for Milestone C decision in 1QFY26. Operational testing of JMEWS employed from TTWCS 7.0 and TMPC 8.0 is planned for FY27.

» MAJOR CONTRACTORS

- Raytheon, a subsidiary of RTX – Tucson, Arizona (AUR)
- Lockheed Martin Rotary and Mission Systems – King of Prussia, Pennsylvania (TTWCS)
- Peraton, Inc. – Santa Clara, California (TMPC)
- Tapestry Solutions – St. Louis, Missouri (TMPC)
- BAE Systems – San Diego, California (TMPC)

TEST ADEQUACY

In September 2023 and June 2024, the Navy completed operational test and cyber survivability evaluation of the TTWCS and TMPC upgrades, respectively, in accordance with the DOT&E-approved test plan and with DOT&E observation. The operational assessment consisted of simulated strike group scenario events in laboratory and shipboard environments, a maintenance demonstration, simulated flight tests, and one live flight test of a Block V missile

launched from a surface ship. Test data are adequate for regression evaluation of the legacy system capabilities and cyber survivability. DOT&E expects to submit a FOT&E Report in 2QFY25.

In March 2024, the Navy conducted a target sled test using the Supersonic Naval Ordnance Research Track (SNORT) at Naval Air Warfare Center Weapons Division China Lake, in accordance with the DOT&E-approved LFT&E Strategy and with DOT&E observation. Additionally, the Navy has incorporated previously collected LFT&E test data into weaponeering and lethality assessment models for continued assessment of JMEWS lethality against target requirements. The Navy plans a target sled test in FY25 in continuance of the JMEWS LFT&E Strategy to aide in determining lethality of the Block Vb AUR. The Navy expects to commence ground launch flight tests against threat representative targets in FY26 after completion of the JMEWS developmental test program and warhead qualification to support a Milestone C decision.

The Navy conducted no operational tests of MST in FY24.

PERFORMANCE

» EFFECTIVENESS

Analysis of operational test data of the TTWCS and TMPC upgrades is ongoing. DOT&E expects to provide an FOT&E report in 2QFY25. Insufficient data are available to provide

assessment on the operational effectiveness of JMEWS or MST.

» SUITABILITY

Analysis of operational suitability data of the TTWCS and TMPC upgrades is ongoing. DOT&E expects to provide an FOT&E report in 2QFY25. Insufficient data are available to provide assessment on the operational suitability of JMEWS or MST.

» LETHALITY

TTWCS and TMPC upgrades do not change AUR lethality. LFT&E data suggest that MST fuzing performs as designed but additional data are required to determine MST lethality against threat-representative ships. Additional data are also required to determine JMEWS lethality.

» SURVIVABILITY

The cyber survivability assessment of the TTWCS and TMPC upgrades is classified. DOT&E expects to provide an FOT&E report in 2QFY25. No data are yet available to determine cyber survivability of MST or JMEWS.

RECOMMENDATIONS

The Navy should:

1. Approve TWS program requirements for MST and provide a TEMP to DOT&E for approval that details its test strategy for operational effectiveness, suitability, lethality, and survivability.

2. Fund and schedule LFT&E of MST to determine lethality against threat-representative ships.
3. Fund follow-on JMEWS T&E efforts to further characterize JMEWS performance and improve weaponeering tools.