

Javelin Antitank Missile System – Medium



The Javelin Antitank Missile System – Medium is undergoing two independent, but complementary upgrades, referred to as the G-model missile and the Lightweight Command Launch Unit (LW CLU). The Army conducted an FOT&E in August 2023 on the LW CLU paired with current inventory missiles. In March 2024, DOT&E published a Javelin Antitank Missile System – Medium FOT&E report with a classified annex, concluding that the upgraded Javelin system is operationally effective, though not operationally suitable, due to a new software fault. The fault has been corrected in the latest software update and will be tested during qualification and acceptance testing. The G-model missile experienced developmental delays due to a flight test failure in FY22, was re-baselined in FY23, and will continue verification of corrective actions in FY25.

SYSTEM DESCRIPTION

The Javelin Antitank Missile System – Medium is a man-portable, shoulder-launched, fire-and-forget weapon system used to defeat threat armored vehicles out to 2,500 meters. The Javelin system consists of a missile in a disposable launch tube assembly (LTA) and a reusable CLU. The CLU mechanically engages the LTA for shoulder firing, has day and night sights for surveillance and target acquisition, and electronically interfaces with the missile for target lock-on and missile launch.

The Javelin system is undergoing two independent, but complementary upgrades intended to control unit cost, reduce size and weight, and address component obsolescence while meeting or exceeding the current F-model missile and Block 1 CLU performance. These system improvements are referred to as the G-model missile and LW CLU. The G-model missile effort is developing a new LTA, electronic battery unit, guidance electronics unit, and missile seeker. Production missiles will be designated FGM-148G. The LW CLU effort incorporates modern daylight and infrared camera technology in a smaller and lighter form factor. The LW CLU is backward compatible with the current inventory of missile models, and the G-model missile will be backward compatible with the legacy Block 1 CLU.

The Army is developing a new Basic Skills Trainer (BST) and the Javelin Outdoor Trainer (JOT) that will be compatible with the upgraded Javelin system.

MISSION

Commanders use Army and Marine Corps ground maneuver units equipped with the Javelin to destroy, capture, or repel enemy assault through maneuver and firepower. Soldiers and marines use the Javelin to destroy threat armor targets and light-skinned vehicles, and to incapacitate or kill threat personnel within fortified positions or in the open.

PROGRAM

Javelin is an Acquisition Category IC program. The Army is upgrading the Javelin weapon system and associated training equipment through multiple engineering change proposals occurring in separate LW CLU and G-model missile development efforts. In March 2024, DOT&E published a Javelin Antitank Missile System – Medium FOT&E report with a classified annex, supporting a LW CLU production decision in October 2024. Fielding of the LW CLU is expected to begin in 1QFY26.

The G-model missile experienced developmental delays due to a flight test failure in FY22. The program was re-baselined in FY23, and analysis of the flight test failure continued through FY24. Verification and validation of corrective actions are planned through FY25. The G-model

missile will continue development and testing over the next four years and begin production upon the completion of a successful government-led qualification flight test series.

DOT&E approved an updated TEMP for the Javelin program in April 2020 and a LW CLU-specific TEMP addendum in February 2023.

» MAJOR CONTRACTORS

- Raytheon, a subsidiary of RTX – Tucson, Arizona
- Lockheed Martin Corporation – Orlando, Florida

TEST ADEQUACY

In FY23, the Army Test and Evaluation Command conducted two operational tests of the Javelin system comparing the LW CLU against the Block 1 CLU, both paired with current inventory missiles. A Limited User Test (LUT) was conducted at the Cold Regions Test Center, Fort Greely, Alaska in March 2023, and an FOT&E at Yuma Proving Ground, Arizona in August 2023. Both tests were observed by DOT&E and conducted in accordance with the DOT&E-approved TEMP and respective test plans. The G-model missile was not mature enough to be included in the LUT or FOT&E. Together, these tests were adequate to determine the operational effectiveness and suitability of the Javelin LW CLU as well as the system performance in the arctic and desert environments. DOT&E published

a Javelin Antitank Missile System – Medium FOT&E report with a classified annex in March 2024. The cyber survivability portion of the FOT&E report will be updated following the LW CLU adversarial assessment (AA) planned for February 2025.

Previous testing included a cooperative vulnerability and penetration assessment (CVPA) in FY22 and an adversarial cybersecurity developmental test (ACDT) in August 2023. Cyber survivability findings are being corrected in the latest LW CLU software update and will be tested during the planned AA.

An update to the Javelin TEMP is necessary to reflect the significant delays in the G-model missile development. The updated TEMP should include a T&E concept for combined LW CLU and G-model missile, testing as well as demonstrating the maximum effective range of the upgraded Javelin, as first recommended in the FY22 Annual Report.

PERFORMANCE

» EFFECTIVENESS

In the FOT&E report, DOT&E assessed the updated Javelin system, consisting of LW CLU and current inventory missiles, is operationally effective. Soldiers equipped with the LW CLU performed as well or better than soldiers equipped with the Block 1 CLU at engaging targets day or night, and across the arctic, temperate, and hot desert

climates. The improved daylight and infrared camera resolution and zoom capabilities make the LW CLU a superior surveillance device when identifying targets beyond the Javelin's 2,500-meter maximum effective range design requirement. Additional details are found in the FOT&E report and

classified annex, published by DOT&E in March 2024.

» LETHALITY

DOT&E last evaluated Javelin's lethality in 2019, following testing of the F-model missile, and found that it met or exceeded its lethality



Testing at the Cold Regions Test Center, Fort Greely, Alaska, March 2023

requirement. Details are found in a classified LFT&E report published by DOT&E in February 2019. Government-led lethality testing of the G-model missile will resume following verification of corrective actions planned for FY25.

» **SUITABILITY**

In the FOT&E report, DOT&E assessed that the LW CLU is not operationally suitable. A new software fault resulted in three system aborts, causing the LW CLU to fail in demonstrating its operational reliability and availability requirements. The Javelin Program Office immediately opened a failure review board and began taking actions to identify and fix the cause of the fault. A root cause was identified, and a fix developed, that has been incorporated in the planned LW CLU software update 4.1. The fix was demonstrated to be effective in both laboratory and environmental chamber settings, addressing a recommendation from the FY23 Annual Report. Software version 4.1 will be fully verified during qualification and acceptance testing, planned for 1QFY25. The LW CLU software update 4.1 should undergo integrated testing with soldier operators prior to equipping the first unit with the LW CLU. Representatives from ATEC and DOT&E should witness the integrated testing. Additional details on the software failure are found in the FOT&E report and classified annex, published by DOT&E in March 2024.

Soldier feedback on the LW CLU was positive, with gunners preferring the improved camera resolution and the smaller, lighter form factor as compared to the Block 1 CLU. Battery performance for both the LW CLU and Block 1 CLU was significantly degraded in the cold temperatures experienced during the LUT. The Army should investigate a long-term replacement strategy for the existing battery to improve cold weather performance.

Soldiers found the new BST was intuitive and easy to use, and they believed that the BST provided the training needed to prepare Javelin gunners to engage targets with the tactical system. Though the JOT systems used during the LUT and FOT&E were pre-production units, soldier feedback indicated that the JOT replicated the target engagement process and supported realistic training. The Army has continued development and testing of the JOT, addressing a recommendation from the FY23 Annual Report.

» **SURVIVABILITY**

Cyber survivability cannot be fully assessed until the completion of an AA, planned for February 2025. Previous testing included a CVPA of Javelin between August and September 2021, during which four cyber survivability findings were identified. An ACDT was conducted in August 2023 and the findings should be corrected in LW CLU software update 4.1. Fixes should be verified prior to the planned AA. A JOT cyber vulnerability identification event is planned in

3QFY25 and an ACDT in 1QFY26. DOT&E will include an update on the system's cyber survivability in 4QFY25, as an addendum to the FOT&E report.

RECOMMENDATIONS

The Army should:

1. Conduct integrated testing of LW CLU software update 4.1 with soldier operators prior to equipping the first unit. Representatives from ATEC and DOT&E should witness the integrated testing.
2. Address the CVPA and ACDT findings through LW CLU software update 4.1 and conduct fix verification testing prior to conducting the AA in February 2025.
3. As recommended in the FY23 Annual Report, update the Javelin TEMP to reflect delays in the G-model missile development and plan for combined G-model missile and LW CLU testing, as well as demonstrating the maximum effective range of the upgraded Javelin system.
4. As recommended in the FY23 Annual Report, investigate a long-term replacement strategy for the existing LW CLU battery to improve cold weather performance.