

Joint Air-to-Ground Missile (JAGM)



The Joint Air-to-Ground Missile (JAGM) has completed operational and live fire testing. Operational and live fire testing was adequate to support a Full-Rate Production decision. A combined IOT&E and LFT&E report of test findings was published July 12, 2022. The JAGM exceeded key performance parameter hit requirements during operational testing. The Army used modeling and simulation to augment missile flight testing and optimize the overall test program.

SYSTEM DESCRIPTION

The JAGM is a precision munition that combines two sensor technologies – a semi active laser and a millimeter-wave radar – into a single seeker and guidance system while leveraging the warhead, motor, and flight control systems from the Helicopter Launched Fire-and-Forget (HELLFIRE) Romeo missile. Army and Marine Corps commanders will employ the JAGM from helicopters to engage enemy combatants in stationary and moving armored and unarmored vehicles, within building and bunker structures, in small boats, and in the open.

MISSION

Army AH-64E Apache and Marine Corps AH-1Z Viper aircrews will employ the JAGM for the destruction of high-value stationary, moving, and relocatable land and maritime targets from standoff range in day, night, adverse weather, and obscured battlefield conditions. Crews will utilize the JAGM to engage heavy and light armored vehicles; small boats; and personnel in buildings, in bunkers, and in the open.

PROGRAM

The JAGM is an Acquisition Category IC joint program led by the Army's Program Executive Office, Missile and Space and is executed in conjunction with the Navy's Program Executive Office,

Unmanned Aviation and Strike Weapons. DOT&E approved the updated Test and Evaluation Master Plan on August 30, 2022. The Army completed the first phase of IOT&E in 3QFY20 and the Navy completed the second phase in 2QFY22. A combined IOT&E and LFT&E report of test findings was published July 12, 2022. The Army conducted a Full-Rate Production decision review in 4QFY22.

» MAJOR CONTRACTOR

- Lockheed Martin Corp. – Orlando, Florida

TEST ADEQUACY

The Army completed the first phase of IOT&E using AH-64E Apache helicopters from March 25 to May 10, 2019. DOT&E published an Operational Assessment in September 2020. The Navy completed the second phase of IOT&E using AH-1Z Viper attack helicopters in 2QFY22. The Navy flight testing included maritime targets at Eglin Air Force Base, Florida and ground targets at Yuma Proving Ground, Arizona from November 1 to December 17, 2021. Flight testing was supported by additional LFT&E, cybersecurity assessments, and developmental and integrated testing. Testing was adequate to evaluate the operational performance of JAGM when employed from the AH-64E and AH-1Z attack helicopters. Operational testing was conducted in accordance with the DOT&E-approved test plan and under DOT&E observation.

PERFORMANCE

» EFFECTIVENESS

The JAGM is operationally effective when employed from the AH-64E and AH-1Z, exceeding key performance parameter hit requirements. JAGM offers pilots increased tactical flexibility to overcome countermeasures or environmental restrictions compared to the HELLFIRE Romeo and the Longbow HELLFIRE missiles it is intended to replace. Effectiveness is reduced under high pilot workloads or in time-constrained conditions when employed from the AH-1Z due to interoperability deficiencies and a cumbersome pilot-vehicle interface (PVI). Deficiencies and PVI issues extended engagement times, caused preflight aborts, and caused AH-1Z pilots to miss one target out of 15 engagements.

The JAGM is lethal when employed from the AH-64E and AH-1Z and is at least as lethal as the HELLFIRE Romeo. Height-of-burst lethality could be improved with system refinements. Lethality against tanks with an active protection system requires additional testing and analysis to refine tactics, techniques, and procedures (TTPs).

The Army effectively utilized modeling and simulation, indicating that JAGM exceeds key performance parameter hit requirements across its operational envelope. Confidence in modeling is informed by thousands of agreements between actual missile performance and pre-shot predictions of trajectory, missile

functionality, missile logic, arrival times, hit points, velocity vectors, and responses to changes in environment and target behavior.

» **SUITABILITY**

The JAGM is operationally suitable when employed from the AH-64E Apache but not when employed from the AH-1Z Viper due to shortcomings in aircraft-missile interoperability and the PVI. AH-1Z testing identified over 60 deficiencies, leading to high pilot workload and challenges using the PVI to conduct engagements. The JAGM itself demonstrated high preflight and in-flight reliability, exceeding reliability requirements.

» **SURVIVABILITY**

JAGM is survivable against a nascent or limited cyber attacker. JAGM is not survivable against a moderate-to-advanced capability threat. The Army mitigated key vulnerabilities found in two cyber test events conducted in 2017. The most recent Navy testing revealed additional vulnerabilities.

RECOMMENDATIONS

The Joint Program Manager and Navy should:

1. Continue development and integration testing to correct AH-1Z deficiencies, and conduct follow-on testing to

verify that they have been adequately addressed.

2. Develop an efficient PVI on the AH-1Z to reduce excessive pilot workloads.
3. Continue development and integration testing of the JAGM Captive Aircrew Training Missile while developing unique TTPs to ensure aircrew effectiveness.
4. Conduct additional tests to refine height-of-burst lethality.
5. Develop TTPs to effectively engage tanks equipped with active protection systems.

