

## HELLFIRE Romeo and Longbow

### Executive Summary

- The HELLFIRE missile (AGM-114) is a family of air-to-surface, guided munitions consisting of a missile body with different warhead types. The Air Force authorized fielding of the latest HELLFIRE Romeo missile variant (with R warhead) in December 2014. Other Services have since pursued different variations of the HELLFIRE missile.
- The Army successfully completed testing of the Romeo missile in 2016 against a new, more representative masonry target at high temperature. The Army plans to implement the R warhead on the Joint Air-to-Ground Missile System, which begins developmental and live fire tests in FY17.
- The Navy plans to employ the HELLFIRE Longbow L&A variant, which utilizes the K2A warhead, on the Littoral Combat Ship (LCS) against threat boat swarms as part of the Surface-to-Surface Mission Module (SSMM). The Navy is in the process of crafting a developmental test program; the operational and live fire test programs were codified in change pages to the LCS Test and Evaluation Master Plan, which DOT&E approved in March 2016.
- The Navy began developmental HELLFIRE Longbow testing in FY15 with the Guided Test Vehicle – 1 (GTV-1) test. In December 2015 and August 2016, the Navy carried out GTV-2 developmental tests from a barge against small boat representative high-speed maneuvering surface targets. These tests could have been leveraged to support the DOT&E effectiveness/lethality evaluation but the Navy has planned and executed all GTV tests to date without DOT&E oversight.

### System

- The AGM-114 HELLFIRE is a family of guided missiles for use against fixed and moving targets by both rotary- and fixed-wing aircraft, including unmanned aerial vehicles (UAVs).
- The HELLFIRE Romeo laser-guided missile variant:
  - Is an air-to-surface missile intended to be launched from Army and Air Force UAV platforms, Air Force Special Operations and Marine Corps fixed-wing aircraft (e.g., MC-130 and KC-130 variants), and Army rotary-wing aircraft. It uses a new warhead and a semi-active laser seeker to home in on its target.



- Has a multi-function warhead that includes variable time delay fuzing options, in order to provide improved lethality against combatants within building structures while maintaining lethality against non-armored targets.
- Is compatible with other HELLFIRE missiles fired from other Air Force UAVs.
- The HELLFIRE Longbow radar-guided missile variant:
  - Is being redesigned from its prior air-to-surface role as employed on Army Longbow Apache helicopters to a new role as a Navy surface-to-surface missile intended to be launched from LCS against threat boats in swarm attacks
  - Has a single-function K2A warhead with a fragmentation wrap designed to provide lethality against small boat targets

### Mission

- Army, Air Force, and Marine Corps commanders will employ HELLFIRE Romeo from a range of UAV, fixed wing, and rotary wing platforms to engage enemy combatants located within complex building and bunker structures, in non-armored vehicles, in small boats, and in the open.
- Navy LCS commanders will employ HELLFIRE Longbow missiles as part of its SSMM against small threat boats involved in swarming attacks against the LCS.

### Major Contractor

Lockheed Martin Corporation, Missiles and Fire Control Division – Grand Prairie, Texas  
(The missiles are manufactured in Ocala, Florida, and Troy, Alabama.)

### Activity

- In FY15, lot acceptance testing of HELLFIRE Romeo R warheads against non-operationally representative (harder than the requirement) masonry targets at elevated temperatures failed in two of the four tests. Subsequently, the Army tested the Romeo missile with the R warhead in June and August

2016 against the operationally representative target at high temperature. The warhead operated successfully in eight of eight tests.

- The Navy carried out GTV-2 HELLFIRE Longbow developmental tests against small boat representative high

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speed maneuvering surface targets in December 2015 and August 2016 without DOT&E oversight. The Navy has not yet delivered an LFT&E Lethality Test Plan for the SSMM utilizing the HELLFIRE Longbow missile, which could have leveraged these developmental tests.

## Assessment

- As reported in DOT&E reports to Congress in FY14, the HELLFIRE Romeo missile demonstrated adequate lethality across a spectrum of expected targets, including small boats, light armor, technical vehicles (trucks), and personnel both in the open and behind/under a variety of masonry structures.
- Army tests of the HELLFIRE Romeo R warhead, completed to support the testing and procurement of the Joint Air-to-Ground Missile program, verified the assessment of adequate lethality against the operationally representative masonry target but have not addressed the underlying cause of the observed failures against harder targets.
- The Navy conducted the early developmental tests of the HELLFIRE Longbow without DOT&E involvement or oversight, missing an opportunity to leverage these data in operational effectiveness and lethality assessments.

## Recommendations

- Status of Previous Recommendations. The Army has begun to address the recommendations in the 2015 DOT&E classified report to further quantify lethality estimates against specific targets in specific conditions and engagement circumstances. However, several target types require additional characterization. The Air Force provided the classified test results to the Joint Technical Coordinating Committee for Munitions Effectiveness (JTTCG/ME) for incorporation into JTTCG/ME products as indicated in the final classified DOT&E report.
- FY16 Recommendations.
  1. The Army HELLFIRE program should characterize the spectrum of masonry target conditions (hardness, density, etc.) where the Romeo warhead fails to detonate when operating at high temperature.
  2. The Navy should develop a Lethality Test Plan for the SSMM utilizing the HELLFIRE Longbow missile, which must be approved by DOT&E.
  3. The Navy should fully fund and fully execute the operational and live fire test plans articulated in the 2016 update to the LCS Test and Evaluation Master Plan.