Javelin Close Combat Missile System – Medium

Executive Summary

- In FY16, the Army tested the Spiral 2 missile improvements and continued development of Spiral 3 missile improvements and a new Light Weight Command Launch Unit (CLU). The Army intends these efforts to improve lethality against non-armored targets and to reduce unit cost and weight.
- Early arena testing and lethality modeling of the Spiral 2 missile, which includes a new Multi-Purpose Warhead (MPWH), has demonstrated improved warhead fragmentation and similar armor penetration compared to the legacy warhead. This indicates the potential for improved lethality against non-armored targets and personnel in the open while maintaining performance against armored threats.
- The precursor warhead (PCWH) has failed to detonate in two of two flight tests and two of nine static warhead tests, and the MPWH failed to detonate in one of nine static warhead tests. The Army stopped the testing of the Spiral 2 missile and convened a failure review board to investigate the cause of the failures. Testing of the Spiral 2 missile will continue into FY17 following resolution of the warhead detonation problems.
- The Program Office has chosen to delay production of the FGM-148F or Spiral 2 missile until the successful resolution of the warhead failures and completion of the missile test program in FY17.
- DOT&E and the Army are planning testing required for the Spiral 3 missile and Light Weight CLU developments.

System

- The Javelin Close Combat Missile System – Medium is a man-portable, fire-and-forget, anti-tank guided missile employed by dismounted troops to defeat threat armored combat vehicles out to 2,500 meters.
- The Javelin system consists of a missile in a disposable launch tube assembly and a re-usable CLU. The CLU mechanically engages the launch tube assembly 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. An operationally-ready Javelin system weighs 49.5 pounds.
- The Javelin missile employs a tandem shaped charged warhead to defeat vehicle armor and can be fired in direct-fire or lofted trajectory top-attack modes.
- The Army has planned four Javelin system improvements to reduce unit cost and weight and improve lethality against non-armored targets. These improvements are referred to as missile Spiral 1, 2, 3, and Light Weight CLU.
  - The Spiral 1 effort will replace electronic components in the control actuator section of the missile for cost and weight savings. Production missiles will be designated FGM-148E.
  - The Spiral 2 effort will develop an MPWH, which uses enhanced fragmentation to improve lethality against non-armored targets and personnel in the open while maintaining lethality against armored threats. Production missiles will be designated FGM-148F.
  - The Spiral 3 effort will develop a new launch tube assembly and battery unit, and will replace the current gas-cooled seeker with an uncooled seeker in the guidance section of the missile. Production missiles will be designated FGM-148G.
  - The Light Weight CLU effort will develop a new CLU that is smaller and lighter while maintaining or improving system performance.

Mission

- Infantry, Engineer, Reconnaissance, and Special Operations Forces within Army and Marine Corps ground maneuver units employ the Javelin to destroy, capture, or repel enemy assault through maneuver and firepower.
- Service members use the Javelin to destroy threat armor targets and light-skinned vehicles, and to incapacitate or kill threat personnel within fortified positions. In recent conflicts, Javelin was used primarily against enemy bunkers, caves, urban structures, mortar positions, snipers, and personnel emplacing IEDs.

Major Contractors

- Raytheon – Tucson, Arizona
- Lockheed Martin – Orlando, Florida

Activity

- In 2016, the Army Aviation and Missile Research, Development, and Engineering Center continued testing of the Spiral 2 missile improvements in accordance with the DOT&E-approved live fire strategy. A total of 7 of 21 planned missile flight tests and 9 of 16 planned static warhead tests have been conducted at the Redstone Test Center, Alabama.
  - Of the seven flight test missiles, one was a tactical round including both a PCWH and MPWH, one contained a PCWH and telemetry payload, and five contained a telemetry payload only
  - The nine static tandem warhead tests included both the PCWH and MPWH
- DOT&E and the Army are planning testing required for the Spiral 3 missile and Light Weight CLU.
- The Javelin Program Office completed testing of the Spiral 1 missile improvements and approved the FGM 148E for the FY17 production lot.

Assessment

- Missile Warhead Performance:
  - Preliminary results of static warhead testing of the MPWH indicate improved fragmentation versus the legacy warhead while maintaining effectiveness against armor. The Army intends the improved fragmentation to enhance lethality of the weapon against non-armored targets and personnel in the open.
  - The PCWH failed to detonate in two of nine static tests and in two of two flight tests. The MPWH failed to detonate in one of nine static tests. Prior Government qualification testing at a contractor facility demonstrated no PCWH or MPWH failures in 62 static tandem warhead tests.
  - The Army conducted investigations after the first two PCWH and the one MPWH failures. Potential problems with the static test setup at Redstone Test Center were corrected and testing resumed. The Army stopped testing and initiated a failure review board after two more PCWH failures occurred. Testing of the Spiral 2 missile will continue following identification and resolution of the failures.
- Missile Flight and Tracking Performance:
  - In seven of seven flight tests conducted to date, the Spiral 2 missiles have demonstrated proper target lock on and missile launch resulting in six successful hits and one miss. The six successful hits were against five tank targets and one pickup truck target; the miss was against a three-man IED team in the open. The miss is attributed to a combination of test range conditions that pulled the tracker off of the target during the flight. Personnel in the open are a secondary target for the Javelin.
- The Program Office has chosen to delay production of the FGM-148F, Spiral 2 missile, until the successful resolution of the warhead failures and completion of the missile test program in FY17.

Recommendations

- Status of Previous Recommendations. The Army and DOT&E are planning testing required for the Spiral 3 and Light Weight CLU. The Army agrees that an operational test should be conducted prior to fielding to confirm that effectiveness/lethality and suitability have not been compromised, and to ensure compatibility with applicable fielded variants of the missile.
- FY16 Recommendation.
  1. The Javelin Program Office should update the Javelin Test and Evaluation Master Plan in preparation for Spiral 3 and Light Weight CLU testing.