AIM-9X Air-to-Air Missile Upgrade

Executive Summary
- The Navy and Air Force originally began AIM-9X Block II IOT&E (OT-C1) with Operational Flight Software (OFS) 9.311 on April 27, 2012. On July 29, 2013, the Program Executive Officer for Tactical Aircraft Programs (PEO(T)) formally decertified AIM-9X Block II due to two major deficiencies discovered and documented during IOT&E that affected missile performance. These deficiencies were poor reliability of the inertial measurement unit and a software performance problem. The contractor implemented an improved production process and updated the missile software (OFS 9.313) to address the two primary deficiencies.
- The Services conducted IOT&E of the Block II missile with OFS 9.313 from June 2014 through March 2015. Testing included 19 scored missile launches; captive-carry testing to examine acquisition, tracking, and reliability; and modeling and simulation.
- IOT&E of the AIM-9X Block II hardware with OFS 9.313 demonstrated that the missile is effective against aircraft and cruise missile targets. Deficiencies discovered in earlier OFS 9.311 were found to be fixed. Additionally, testing demonstrated that the missile is suitable on the F-15 and F-16 aircraft and not suitable on the F/A-18 aircraft due to a high number of aircraft-related built-in test (BIT) failures on the F/A-18.
- The Navy achieved Initial Operational Capability of AIM-9X Block II on March 31, 2015, with Carrier Air Wing FIVE.
- The Assistant Secretary of the Navy (Research, Development, and Acquisition) approved Full-Rate Production (FRP) via an Acquisition Decision Memorandum dated August 17, 2015.
- The Air Force and Navy are in the final stages of test planning to conduct AIM-9X cybersecurity testing.

System
- AIM-9X is the latest generation short-range, heat-seeking, air-to-air missile. The currently fielded version of the Block I missile is OFS 8.220, which includes limited lock-on-after-launch, full envelope off boresight capability with a helmet-mounted cueing system, and improved flare rejection performance.
- AIM-9X Block II missiles are currently fielded with 9.314 software, which significantly builds from 8.220 software with datalink, lofted trajectories, full lock-on-after-launch capability, and improved high-off boresight capability and flare rejection.
- AIM-9X is highly maneuverable, day/night capable, and includes the warhead, fuze, and rocket motor from the previous AIM-9M missile.

- AIM-9X added a new imaging infrared seeker, vector controlled thrust, digital processor, and autopilot. F-15C/D, F-16C/D, and F/A-18C/D/E/F aircraft are capable of employing the AIM-9X, with ongoing integration activities being conducted for the F-15E, F-22, and F-35A/B/C.
- The AIM-9X Block II is the combination of AIM-9X-2 hardware and OFS 9.314. (OFS 9.314 is the designation following required security requirements implemented in the 9.313 OFS).
  - AIM-9X Block II is the latest hardware version and is designed to prevent parts obsolescence and provide processing capability for the OFS 9.4 upgrade. The AIM-9X-2 missile includes a new processor, a new battery, an electronic ignition safe/arm device, and the DSU-41/B Active Optical Target Detector fuze/RF datalink assembly.
  - OFS 9.4 is a future software upgrade that is intended to add improved lock-on-after-launch, target re-acquisition, improved fuzing, and surface attack.

Mission
Air combat units use the AIM-9X to:
- Conduct short-range offensive and defensive air-to-air combat
- Engage multiple enemy aircraft types with passive infrared guidance in the missile seeker
- Seek and attack enemy aircraft at large angles away from the heading of the launch aircraft

Major Contractor
Raytheon Missile Systems – Tucson, Arizona

Activity

- On July 29, 2013, the AIM-9X Program Office and Raytheon Missile Systems implemented hardware and software solutions to address the two primary deficiencies discovered in OFS 9.311 testing that led to PEO(T) decertification of the program from testing.
- On June 5, 2014, the Navy completed an Operational Test Readiness Review and PEO(T) re-certified AIM-9X Block II with OFS 9.313 for IOT&E. DOT&E approved a test plan change reducing the number of captive-carry missions to 28 (14 per Service) and removed one of the 17 live missile tests from the originally approved IOT&E plan.
- The Services conducted an IOT&E of AIM-9X Block II with OFS 9.313 from June 2014 through March 2015, in accordance with the DOT&E-approved test plan. Testing included 19 scored flight tests, 26 captive-carry acquisition and tracking missions, 2,402 hours of captive carry reliability data, and 20,000 modeling and simulation runs.
- The Assistant Secretary of the Navy (Research, Development, and Acquisition) approved FRP via an Acquisition Decision Memorandum dated August 17, 2015.

Assessment

- DOT&E assessed that the AIM-9X Block II missile with OFS 9.313:
  - Is effective. In flight testing, 15 of 19 scored missile launches achieved a lethal intercept. Captive-carry testing demonstrated solid acquisition and tracking performance. Demonstrated missile reliability is on track to meet requirements.
  - Is suitable on the F-15 and F-16 aircraft, but not suitable on the F/A-18 aircraft due to a high number of BIT failures related to F/A-18 software. In 2,402 hours of captive-carry reliability testing, 80 aircraft-related BIT failures occurred, all of which were on the F/A-18. .
  - Future F/A-18 software (H10 planned for FY16) addresses the power management errors behind the BIT failures that led to the not suitable assessment of Block II on F/A-18.
- IOT&E of the Block II hardware with OFS 9.313 demonstrated that the two previous deficiencies that led to decertification have been addressed successfully.
- The Air Force and Navy are in the final stages of test planning to conduct AIM-9X cybersecurity testing.

Recommendations

- Status of Previous Recommendations. The Navy is in the process of completing the FY14 recommendation to work closely with DOT&E and the Service Operational Test Agencies to establish the plan, requirements, and resources for OFS 9.400 testing, including the associated Test and Evaluation Master Plan update.
- FY15 Recommendations.
  1. The Navy should verify that F/A-18 H10 software resolves the BIT problems that led to a rating of not suitable.
  2. The Services should complete cybersecurity testing on the AIM-9X in accordance with the August 1, 2014 DOT&E policy memorandum.