

## AIM-9X Air-to-Air Missile Upgrade

### Executive Summary

- The Navy completed AIM-9X Block II Integrated Testing in March 2012. The Navy assessed 8 of 12 missile shots conducted before the Operational Test Readiness Review (OTRR) as “hits.” Developmental testing also included 83 captive-carry missions with telemetry analyzed in detail, and more than 3,700 captive-carry hours for quantifying reliability.
- The Navy and Air Force began IOT&E on April 27, 2012. During operational testing to date, the Navy has completed 10 of 22 planned captive-carry events and 2 of 9 live missile shots. The Air Force has completed 10 of 22 captive-carry flights and 4 of 8 live missile shots. Four of the six live missile shots have passed within lethal radius of the target. The Services plan to complete IOT&E in July 2013.
- As of mid-November 2012, the Services had accomplished 5,460 total captive-carry hours and had 23 failures resulting in a Mean Time Between Captive-Carry Failure (MTBCCF) of 237 hours. The current system reliability is slightly below the value on the reliability growth curve consistent with reaching the requirement of 500 hours MTBCCF at 80,000 hours.

### System

- AIM-9X is the latest generation short-range, heat-seeking, air-to-air missile. The currently fielded version of the missile is AIM-9X Block I, Operational Flight Software (OFS) 8.220, which includes limited lock-on-after-launch, full envelope off-boresight capability without a helmet-mounted cueing system, and improved flare rejection performance.
- 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/F aircraft can carry the AIM-9X.
- The AIM-9X Block II is the combination of AIM-9X-2 hardware and OFS 9.3.
  - AIM-9X-2 is the latest hardware version and is designed to prevent parts obsolescence and provide processing capability for the OFS 9.3 upgrade. The AIM-9X-2 missile



includes a new processor, a new ignition battery for the rocket motor, an electronic ignition safety/arm device, and the DSU-41/B Active Optical Target Detector (AOTD) fuze/datalink assembly.

- OFS 9.3 is a software upgrade that is intended to add trajectory management to improve range, datalink with the launching aircraft, improved lock-on-after-launch, target re-acquisition, and improved fuzing.

### 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

- The Navy completed AIM-9X Block II (AIM-9X-2 with OFS 9.3) developmental testing in March 2012. Developmental testing consisted of 12 free flight shots, 4 of which were conducted with the final software version (OFS 9.311). It also included 83 captive-carry missions with

telemetry analyzed in detail, and more than 3,700 captive-carry hours for quantifying reliability.

- The Navy conducted an OTRR in April 2012, and certified readiness for AIM-9X Block II IOT&E under the DOT&E-approved June 2011 TEMP and March 2012 test plan.

# NAVY PROGRAMS

- The Navy and Air Force began IOT&E in April 2012. During operational testing to date, the Navy has completed 10 of 22 planned captive-carry events and 2 of 9 live missile shots. The Air Force has completed 10 of 22 captive-carry flights and 4 of 8 live missile shots.
- The Services plan to complete IOT&E in July 2013, with a Full-Rate Production decision in April 2014 and Initial Operational Capability planned for September 2014.

## Assessment

- During developmental testing, 9 of 12 total missile shots guided to within lethal radius of the drone. One of those nine missiles did not receive a fuze pulse, resulting in no detonation within proximity of the drone. Therefore, the Navy assessed 8 of 12 shots conducted before the OTRR as “hits.”
- All captive-carry missions were nominal, but the Air Force highlighted one performance discrepancy with AIM-9X Block II Helmet-less High Off-Boresight (HHOBS) performance. It is possible that Block II is slower to acquire targets in HHOBS than Block I. The Capability Production Document (CPD) requires the AIM-9X Block II performance be equal to or better than baseline AIM-9X performance.
- At the OTRR, reliability was 232 hours MTBCCF and is projected to reach 316 hours at the end of IOT&E. As of mid-November 2012, the Services had accomplished 5,460 total captive-carry hours and had 23 failures resulting in an MTBCCF of 237 hours. The current system reliability is slightly below the value on the reliability growth curve consistent with reaching the requirement of 500 hours

MTBCCF at 80,000 hours. DOT&E will track reliability through IOT&E.

- All Navy and Air Force IOT&E captive-carry sorties to this point have achieved mission objectives. As of November 15, 2012, 4 of 6 live missile shots have been successful. The AIM-9X Block II did not achieve a hit on the fourth shot by the Air Force, attempted in September 2012. It was a lock-on-after-launch shot, which initially locked on the target but then lost track and did not re-acquire. The Navy’s first shot, attempted in October 2012, was also unsuccessful. It was another lock-on-after-launch shot that did not acquire the target. Data results are still pending for both unsuccessful attempts. To date, the Air Force and Navy have not reported any weapon system deficiencies during IOT&E.

## Recommendations

- Status of Previous Recommendations. The Navy satisfactorily addressed previous recommendations.
- FY12 Recommendation.
  1. The Navy should address the Air Force’s concern of HHOBS performance. It should gather data to verify or disprove AIM-9X Block II performance slip during HHOBS performance. If Block II performance is worse than that of Block I in HHOBS, consider a software modification to improve HHOBS performance and comply with the CPD requirement of achieving performance equal to or greater than Block I.