

AIM-120 Advanced Medium-Range Air-to-Air Missile (AMRAAM)



The Advanced Medium-Range Air-to-Air Missile (AMRAAM) Air Intercept Missile (AIM)-120D System Improvement Program (SIP)-3 completed operational testing in FY22. DOT&E assessed the system as effective, suitable, and survivable, with one issue and several recommendations identified in the DOT&E classified test report, dated November 2022. In June 2022, the Air Force and Navy commenced integrated testing of the new AIM-120D3 missile configuration with SIP-3F software and expect completion in FY23.

SYSTEM DESCRIPTION

The AMRAAM is a radar-guided, air-to-air missile with capability in both the beyond-visual-range and within-visual-range arenas. F-35A/B/C, F-22A, EA-18G, F/A-18C/D/E/F, F-16C/D, and F-15C/D/E aircraft can all employ AMRAAM, including multiple-target engagements with multiple missiles simultaneously. The AIM-120D is the newest variant in the AMRAAM family of missiles and includes both hardware and software improvements over the AIM-120C3-C7. Multiple planned follow-on SIPs will provide updates to the AIM-120D to enhance missile performance and resolve previous deficiencies. The AIM-120D3 missile configuration incorporates a form-fit-function hardware refresh to replace obsolete components and re-hosts the SIP-3 operational flight software as SIP-3F.

MISSION

The Air Force, Navy, and several foreign military forces employ various versions of the AIM-120 AMRAAM to conduct air-to-air combat missions. All U.S. fighter aircraft use the AMRAAM as the primary beyond-visual-range air-to-air weapon.

PROGRAM

The AMRAAM SIP-3 upgrade is a project under the Acquisition Category IC AMRAAM program. DOT&E approved the SIP-3 revision

of the Test and Evaluation Master Plan in 2019. The Air Force and Navy completed SIP-3 operational testing in FY22; the Air Force fielded the software in January 2022, and the Navy fielded the software in March 2022. SIP-3F integrated testing began in June 2022 and expects completion in FY23.

» MAJOR CONTRACTOR

- Raytheon Missiles and Defense – Tucson, Arizona

TEST ADEQUACY

In FY22, the Air Force completed SIP-3 integrated and operational testing in accordance with the DOT&E-approved test plan, and DOT&E personnel observed the testing. Based on the test results, DOT&E made several recommendations for future test environments and scenarios to enhance test adequacy. DOT&E approved the SIP-3F test plan in June 2022; integrated testing is ongoing, with two of five planned missile flight tests complete thus far.

The Air Force completed a cooperative vulnerability and penetration assessment and an adversarial cyber survivability assessment in FY22.

PERFORMANCE

» EFFECTIVENESS

SIP-3 software is effective, with one platform integration issue

identified. Details are available in the November 2022 classified DOT&E test report.

» SUITABILITY

SIP-3 software is suitable, with significantly better overall reliability than specification. Details are available in the November 2022 classified DOT&E test report.

» SURVIVABILITY

SIP-3 is survivable, with one issue and several recommendations for improvement and future testing. Details are available in the November 2022 classified DOT&E test report.

RECOMMENDATIONS

DOT&E recommends that the Air Force and Navy, in coordination with DOD, develop a full-scale target with 5th-generation signatures to enable adequate operational testing of planned future capabilities. While the hardware improvements in the AIM-120D3 missile configuration are meant only to replace obsolete components, the extent of the refresh will likely yield improved capabilities against modern threats. A full-scale target with fifth-generation signatures would provide a holistic surrogate for modern, operationally representative threats with adequate power and cooling for associated, modern on-board defensive systems. Sub-scale targets have significant limitations representing modern threat aircraft.