

B-2 Defensive Management System Modernization (DMS-M)

Executive Summary

- In FY16, the Air Force developed a revised acquisition and test strategy for the B-2 Defensive Management System Modernization (B-2 DMS-M) program in support of an acquisition Milestone B decision. DOT&E approved the B-2 DMS-M Milestone B Test and Evaluation Master Plan (TEMP) in October 2015. USD(AT&L) approved program entry into the engineering, manufacturing, and development (EMD) phase on March 24, 2016.
- Contractor design activities are in progress, leading to a system-level critical design review in early FY17. Planning is in progress to modify a single B-2 test aircraft with new system components in FY17 to support installed system testing in the Benefield Anechoic Facility (BAF) at Edwards AFB, California. Developmental flight tests will begin in FY18, leading to an Air Force Operational Test and Evaluation Center (AFOTEC) operational assessment in FY19 and IOT&E in FY20.
- Beginning in FY17, the DOD Electronic Warfare Infrastructure Improvement Program (EWIIP) will deliver improved test range capabilities that are highly relevant to B-2 DMS-M operational testing. It is essential that the B-2 DMS-M program incorporate these improved threat representations, as they become available, into planned developmental and operational flight test events.
- The development of AFOTEC modeling and simulation (M&S) validation plans for the B-2 Weapons Support and Sustainment Center (WSSC) facility and related M&S tools is a critical early test planning requirement. Clear definition and approval of operational test M&S validation data requirements – in advance of planned FY18 BAF risk-reduction testing – is required to ensure efficient use of this early test opportunity.

System

- The B-2 is a two-pilot, long-range, air-refuelable, all-weather bomber aircraft designed to employ both nuclear and non-nuclear precision-guided weapons. It incorporates stealth technologies to reduce radar cross section and minimize electronic, infrared, acoustic, and visual signatures.
- B-2 mission systems include a GPS-aided precision navigation system, strategic radar targeting system, electronic support measures, and worldwide communications and data transfer systems.
- The B-2 can carry up to 50,000 pounds of munitions in internal bomb bays. Current weapons capabilities include a wide range of both nuclear and non-nuclear precision-guided munitions.



- The B-2 DMS-M upgrades include a digital electronic support measures (ESM) subsystem, new ESM antennas, and modern display processing units to improve threat radar detection, identification, and avoidance capabilities. Associated software components integrate these upgraded systems with existing B-2 avionics systems to improve overall pilot threat awareness, threat reaction, and survivability.

Mission

- Theater Commanders primarily use B-2 bomber aircraft to accomplish worldwide nuclear and conventional missions intended to find, fix, target, engage, and assess heavily defended, high-value targets located in denied adversary airspace.
- B-2 theater mission tasks include strategic attack, time-sensitive targeting, air interdiction, suppression/destruction of enemy air defenses, and nuclear deterrence.

Major Contractor

Northrop Grumman Aerospace Systems – Redondo Beach, California

FY16 AIR FORCE PROGRAMS

Activity

- In FY16, the Air Force developed a revised acquisition and test strategy for the B-2 DMS-M program in support of an acquisition Milestone B decision. DOT&E approved the B-2 DMS-M Milestone B TEMP in October 2015. USD(AT&L) approved program entry into the EMD phase on March 24, 2016. The approved program schedule includes a Milestone C Low-Rate Initial Production decision in FY19, followed by IOT&E and the Full-Rate Production decision in FY20.
- Contractor design activities are in progress, leading to a system-level critical design review in early FY17. Following design approval, the program plans to conduct extensive hardware-in-the-loop laboratory and digital simulation risk reduction testing. Planning is in progress to modify a single B-2 test aircraft with new system components in FY17 to support installed system testing in the BAF at Edwards AFB, California. Developmental flight tests will begin in FY18, leading to an AFOTEC operational assessment in FY19 and IOT&E in FY20.
- The approved Air Force operational test strategy includes evaluation of B-2 defensive system performance in the open-air test range environment, leveraging new adversary threat system emulation capabilities provided by the EWIP. The AFOTEC strategy also includes an extensive digital M&S component to evaluate performance in more advanced threat environments. AFOTEC is currently developing validation and verification plans necessary to support accreditation of the B-2 WSSC laboratory and other tools for operational test purposes.

Assessment

- The approved B-2 DMS-M TEMP defines a highly integrated developmental and operational test strategy that includes open-air test range missions as the most critical component. Beginning in FY17, EWIP will deliver improved test range capabilities that are highly relevant to B-2 DMS-M operational testing. It is essential that the B-2 DMS-M program incorporate these improved threat representations, as they become available, into planned developmental and

operational flight test events to support an adequate evaluation of operational effectiveness and suitability.

- Development of AFOTEC M&S validation plans for the B-2 WSSC facility and related M&S tools is a critical early test planning requirement. Clear definition and approval of operational test M&S validation data requirements, in advance of planned FY18 BAF risk-reduction testing, is required to ensure efficient use of this early test opportunity.
- Due to operational priorities and the small B-2 fleet size, the B-2 DMS-M program must rely on a single test aircraft to support the entire 3-year developmental and operational ground and flight test program. Reliance on a single test asset significantly increases schedule execution risk. Limited test asset availability will also require close coordination between developmental and operational test organizations to meet program test requirements and schedule milestones.
- Previous B-2 operational test periods have incorporated only limited cybersecurity vulnerability and adversarial assessments. The B-2 DMS-M TEMP defines a more extensive cybersecurity test strategy comprised of progressive test events leading to a full IOT&E assessment of system-level cybersecurity status. Detailed planning and execution of this strategy is a critical IOT&E requirement.

Recommendations

- Status of Previous Recommendations. This is the first annual report for this program.
- FY16 Recommendations. The B-2 Program Office and AFOTEC should:
 1. Coordinate B-2 DMS-M M&S validation and verification plans with DOT&E in advance of the planned installed system testing in BAF scheduled for FY17. These plans should also include validation data requirements to be collecting during integrated flight test events planned to begin in FY18.
 2. Coordinate with DOT&E to incorporate more advanced threat scenarios, based on new EWIP threat emulation capabilities, into integrated test events and operational flight test plans.