

B-2 Radar Modernization Program (B-2 RMP)

Executive Summary

- The B-2 Radar Modernization Program (RMP) completed IOT&E for Mode Set 1 in December 2008. Mode Set 1 consists of conventional mission and weapons delivery capabilities. Mode Set 2 incorporates nuclear mission capabilities. Mode Set 2 FOT&E is scheduled to begin in November 2009.
- RMP Mode Set 1 is effective with some limitations in the weather avoidance mode.
- B-2s configured with RMP are as survivable as aircraft configured with the legacy radar, and RMP system suitability is no worse than that of the legacy radar system though some technical publications were incomplete.
- The B-2 On Board Test System (OBTS) requires follow-on testing to confirm that the system meets the user defined requirements.

System

- The B-2 is a multi-role, low-observable bomber capable of delivering conventional and nuclear munitions. It has four turbofan engines and twin side-by-side weapons bays.
- The B-2 RMP features an Active Electronically Scanned Array radar operating on a new frequency. The RMP replaces the B-2 legacy radar antenna and transmitter and changes radar operating frequency to avoid conflicts with other radar frequency spectrum users. The RMP does not add additional capabilities to the B-2 radar beyond those in the legacy system.
- System avionics include a multi-mode radar, GPS-aided navigation, and a Defensive Management System for radar warning functions.
- The bomber's principal conventional weapons are the 2,000-pound and 500-pound Joint Direct Attack Munition.
- The B-2 RMP delivers capability in two separate radar Mode Sets. Mode Set 1 consists of conventional mission



and weapons delivery capabilities. Mode Set 2 incorporates nuclear mission capabilities.

Mission

- Combatant Commanders use the B-2 aircraft to attack global targets during the day or at night, in all weather, in highly defended threat areas at the strategic, operational, and tactical levels of warfare.
- Commanders use the B-2 to engage high-value, heavily defended target sets including: command and control facilities, airfields, industrial complexes, logistical and air defense systems, lines of communication, and battlefield forces and equipment.

Prime Contractor

- Northrop Grumman, Los Angeles, California

Activity

- The Air Force Operational Test and Evaluation Center (AFOTEC) conducted B-2 RMP Mode Set 1 IOT&E from October through December 2008 in accordance with the DOT&E-approved Test and Evaluation Master Plan and IOT&E Plan.
- Air Combat Command conducted a B-2 Force Development Evaluation (FDE) assessing B-2 RMP Mode Set 1 performance from April through September 2009.
- The Air Force completed developmental testing of B-2 RMP Mode Set 2 capabilities in FY09.

- The September 2009 DOT&E B-2 Radar Modernization Program Mode Set One Operational Test and Evaluation Report assessed B-2 RMP Mode Set 1 operational effectiveness, suitability, and survivability.

Assessment

- AFOTEC IOT&E results demonstrated that B-2 RMP Mode Set 1 is operationally effective, suitable, and survivable with some limitations.

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- RMP effectiveness in air-to-ground mapping, targeting, and weapons accuracy and in air-to-air aircraft rendezvous was at least as good as the legacy system.
- RMP detection and display of weather phenomena in the weather avoidance mode was inconsistent with the actual weather location relative to the aircraft; weather phenomena such as thunderstorms were approximately five miles closer to the aircraft in range than cockpit-displayed RMP detections. Operational aircrews must increase desired weather avoidance distances by five miles to compensate for this discrepancy. DOT&E assesses that this limitation will not preclude the B-2 from accomplishing its conventional operational missions.
- There is reasonable confidence that RMP system suitability is no worse than that of the legacy radar system. Incomplete aircrew and maintenance technical publications required work around actions to ready RMP aircraft for flight missions, but this shortfall did not adversely affect RMP maintainability.
- The B-2 RMP OBTS is designed to provide 100 percent detection of radar system hardware or software faults. There was one hardware failure occurrence during FDE where OBTS did not detect the failed radar hardware module. Follow-on operational testing or assessment of OBTS performance in B-2 operational units is required to confirm that OBTS capability meets the user-defined requirements.
- Flight testing and aircraft signature analysis demonstrated that the RMP system is as survivable as the legacy radar system. The RMP caused no degradation of B-2 aircraft signatures, probability of intercept, or the Defensive Management System.

Recommendations

- Status of Previous Recommendations. There are no outstanding recommendations.
- FY09 Recommendations.
 1. The Air Force should ensure that B-2 aircrews are fully trained on RMP Mode Set 1 weather avoidance mode limitations, and establish operational procedures that enable mission accomplishment given the weather avoidance mode display discrepancies.
 2. The Air Force should complete, verify, and validate the applicable RMP aircrew and maintenance technical publications to support RMP sortie generation and mission execution.
 3. The Air Force should evaluate RMP OBTS performance through follow-on operational testing or assessment of system performance in B-2 operational units to confirm system capability meets the user-defined requirements.