

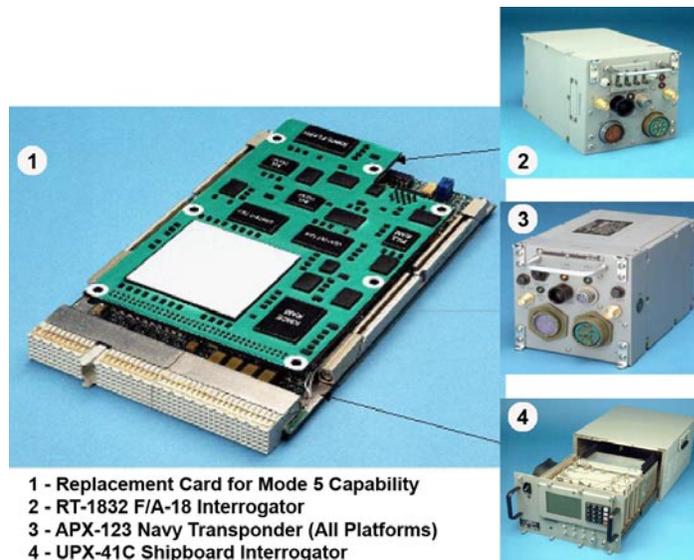
Mark XIIA Identification Friend or Foe (IFF) Mode 5

Executive Summary

- The Mode 5 Identification Friend or Foe (IFF) system continues to mature and is being integrated into Navy, Air Force, Army, and Marine Corps air, sea, and ground systems. Tests have indicated some system performance deficiencies including false targets, track swapping, and below threshold reliability.
- Mode 5 enterprise strategy and guidance continues to mature with the approval of the Joint Acquisition and Test Strategy and continued development of the Joint Operational Test Approach (JOTA).
- The Commander, Operational Test and Evaluation Force (COTF) conducted an operational assessment of Mode 5 in July 2009.

System

- The Mark XIIA IFF Mode 5 is a cooperative identification system that uses interrogators and transponders located on host platforms to send, receive, and process friendly identification data.
- Mode 5 serves as a component of a combat identification process used on ground-based systems and command and control nodes such as Patriot, sea-based systems such as Aegis-equipped ships, and military aircraft to include the E-3 Airborne Warning and Control System and E-2 Hawkeye.
- Mode 5 is a military-only identification mode, which modifies the existing Mark XII system and addresses known shortcomings of Mode 4. Mode 5 will eventually replace Mode 4 and allows National Security Agency-certified secure encryption of interrogations and replies. Primary features include:
 - A lethal interrogation format, which is used by a “shooter” prior to weapons release to reduce fratricide; this is done with the Mode 5 reply from the target even with his Mode 5 system in standby
 - A random-reply-delay, to prevent distorted replies from closely spaced platforms



1 - Replacement Card for Mode 5 Capability
 2 - RT-1832 F/A-18 Interrogator
 3 - APX-123 Navy Transponder (All Platforms)
 4 - UPX-41C Shipboard Interrogator

- Mode 5 offers more modern signal processing, compatibility with legacy Mode 4 IFF systems and civilian air traffic control, and secure data exchange through the new waveform.

Mission

The Combatant Commander employs the Mode 5 to provide positive, secure, line-of-sight identification of friendly platforms equipped with an IFF transponder in order to differentiate between friend and foe.

Prime Contractors

- Navy and Army Mode 5 Programs: BAE Systems, Systems Integration and Electronics Division, Wayne, New Jersey
- Air Force Mode 5 Program: Raytheon Network Centric Systems Division, McKinney, Texas

Activity

- The Navy scheduled an IOT&E of Mode 5 in July 2009, which was to include air, land, and sea platforms from all four Services. The Air Force declared that the Mode 5 equipped F-15 aircraft required additional systems integration development and would not be operationally representative in time for the scheduled Mode 5 IOT&E.
- DOT&E deemed the IOT&E without four Mode 5 equipped F-15 aircraft not adequate to determine effectiveness and

suitability. The Navy then decided to conduct the planned test as an operational assessment.

- COTF conducted an operational assessment of Mode 5 in July 2009.
- DOT&E approved the Joint Acquisition and Test Strategy for Mode 5.
- The Services, Operational Test Agencies (OTAs), and the OSD continued development of the JOTA.

NAVY PROGRAMS

- Marine Corps Operational Test and Evaluation Activity (MCOTEA) is reviewing documentation and test reports to support future Marine Corps ground sensor and C2 system Mode 5 implementation efforts and programmatic requirements.
- The Navy agreed to revise the Mode 5 Test and Evaluation Master Plan (TEMP) and initiate preparation of a Capability Production Document (CPD) to replace the Operational Requirements Document dated 2001.

Assessment

- Although COTF is still analyzing the Mode 5 operational assessment data, the preliminary DOT&E assessment is that additional development is required to resolve performance and integration deficiencies before the system is ready for IOT&E. Observed system deficiencies include false targets, targets swapping track identities, below threshold reliability, and several areas of incompatibility between Mode 5 and the Navy Aegis Combat System aboard DDG-class ships.
- There is no Memorandum of Agreement between the COTF, Air Force Operational Test Agency (AFOTEC), and Army Test and Evaluation Command, designating the Lead OTA for Mode 5 operational testing.
- The Mode 5 IOT&E must be a joint test and include Mode 5 assets from all four Services in order to completely assess interoperability of Mode 5 in a dense target environment.
- The Mode 5 TEMP revision and CPD are needed to correct inconsistencies, establish reliability and maintainability

requirements for the Mode 5 test set, and provide differentiation between reliability and maintainability measures between shipboard and airborne Mode 5 systems.

Recommendations

- Status of Previous Recommendations. All previous recommendations have been satisfactorily addressed.
- FY09 Recommendations.
 1. The Navy should resolve Mode 5 integration and compatibility issues between aircraft and Aegis class DDGs before scheduling Mode 5 IOT&E in 2010.
 2. The Air Force should resolve Mode 5 integration issues in the F-15 aircraft before participating in the Navy Mode 5 IOT&E in 2010.
 3. The Services and OSD should complete development of the JOTA document before the end of 2QFY10.
 4. The Services should designate a Lead OTA for each of the planned Mode 5 operational test events and include this designation in the JOTA document.
 5. COTF and AFOTEC should enter into a Joint Memorandum or Agreement to conduct joint operational testing of Mode 5.
 6. MCOTEA should provide to COTF areas of interest and potential future involvement with ground sensor/C2 Mode 5 implementation.
 7. The Navy should continue plans to revise the TEMP and initiate a CPD in order to correct inconsistencies and clarify requirements.