

## Mark XIIA Identification Friend or Foe (IFF) Mode 5

### Executive Summary

- In FYO4, DOT&E placed all Mark XIIA acquisition programs on oversight.
- The Army, Navy, and Air Force have each initiated separate acquisition programs to develop and field Mark XIIA Identification Friend or Foe (IFF) transponders and interrogators. DoD Strategic Planning Guidance for FY06-11 directed the Navy to develop a Joint acquisition management plan for Mark XIIA Mode 5 IFF; however, Mark XIIA is not a Joint acquisition program.

### System

- The Mark XIIA IFF is an identification system that uses interrogators and transponders located on host platforms to send, receive, and process radio frequency waveforms (or modes) for friendly identification and data exchange.
- Mode 5 is a military only identification mode, which will replace Mode 4 and allows secure encryption of interrogations and replies. Primary features include:
  - A lethal interrogation format, which is intended to reduce fratricide
  - A random-reply-delay, which prevents distorted replies from closely spaced platforms
- The Mark XIIA IFF offers more modern signal processing, compatibility with legacy Mode 4 IFF systems and civilian air traffic control, and data exchange through the new (Mode 5) waveform.

### Mission

- The combatant commander employs the Mark XIIA IFF to provide positive, secure, line-of-site identification of friendly platforms equipped with an IFF transponder.



- Mark XIIA IFF serves as a component of a combat identification process used on ground- and sea-based systems such as PATRIOT, AEGIS class ships, and all military aircraft to include E-3 Airborne Warning and Control System.
- This system combines IFF responses with other cooperative and non-cooperative combat identification techniques in order to provide identification of all platforms – enemy, neutral, and friendly.

### Activity

- In June 1995, Under Secretary of Defense (Acquisition, Technology, and Logistics) and the Vice Chairman Joint Chiefs of Staff tasked the Navy to lead the Joint/Allied effort to develop a new Mark XIIA waveform to improve and secure DoD cooperative capability.
- The Navy developmental/operational Joint interoperability testing began in October 2004, and included participation from the Air Force and the E-3 Airborne Warning and Control System aircraft equipped with a prototype interrogator. Laboratory interoperability testing, accomplished in 2005, included interrogators and transponders developed for the Italian Air Force.
- The Navy will conduct an operational assessment of a Navy airborne transponder and a ship-based interrogator

- in 2QFY06. This assessment will support a decision for low-rate initial production of the transponders and ship-based interrogators.
- The Army has started to hold regular test planning meetings for their Air Defense Interrogator, which is being developed as a common solution for all Army air defense platforms including PATRIOT. The first operational test of the PATRIOT air defense system equipped with the Air Defense Interrogator will be conducted in 2006.
- The Army is also purchasing transponders that are being developed by the Navy. These transponders are to be used in their rotary-wing aircraft.
- The initial test strategy for the Air Force is currently under development. The first test related meeting was held in

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September 2005. An early operational assessment will be conducted in FY06.

## Assessment

- Prior to the Navy program being placed on oversight by DOT&E, the Service approved its Test and Evaluation Master Plan for Mark XIIA IFF in November 2003. Although the Navy leads the way in scheduled Joint interoperability test events, the Army and Air Force have yet to establish a clear schedule, but are continuing to pursue test opportunities.
- Host platforms critical for testing the Mark XIIA IFF mission will be coming online at various times. Testing will be complicated by the fact that each Service plans to field interrogators and transponders over a period of many years.
- The certification of cryptographic computers by the National Security Agency has been delayed because the basic Mode 5 reply was considered vulnerable to spoofing. There is a National Security Agency/North Atlantic Treaty Organization-approved solution that is being implemented but has not been tested.
- The Navy developmental/operational testing exposed problems with false target generation in the current implementation of Mark XIIA IFF. The solution to this problem is still being addressed.

- Substantial collaboration between the Services toward sharing test assets, results, and the coordination of efforts is taking place.
- The Army and Air Force do not have traditionally structured acquisition programs.

## Recommendations

1. The Services' Program Managers must integrate their test schedules and look for opportunities to test in a Joint environment. This will ensure interoperability between all interrogators, transponders, and dual interrogator transponders.
2. Service Program Managers must ensure that all systems being developed interoperate properly as follows:
  - Coordinate testing between each of the Services' operational test agencies
  - Develop a capstone Test and Evaluation Master Plan between all of the Services for Mark XIIA IFF