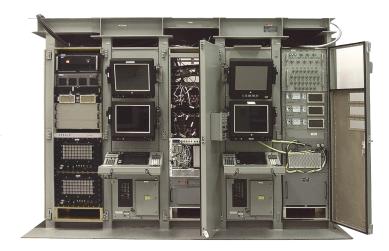# AN/BLQ-10 Submarine Electronic Warfare Support System

Executive Summary

- In August 2017, DOT&E issued a classified report on FOT&E completed in FY16 and concluded that the AN/BLQ-10 system with the Technical Insertion 10 (TI-10) upgrade improves the system's intercept capability against communications signals. The test was adequate to determine the system's operational effectiveness but not its operational suitability. DOT&E's assessment is discussed in the classified report.
- DOT&E removed the AN/BLQ-10 program from oversight in FY17.

System

- The AN/BLQ-10 system is an electronic warfare support system for U.S. submarines. It is intended to provide automatic intercept capability (detection, classification, localization, and identification) for both radar and communications signals.
- The AN/BLQ-10 uses multiple subsystems to process signals collected with the submarine's masts. Radar signals are collected by the imaging mast, which is either a photonics mast (on the *Virginia* class) or a periscope (on all other classes). Communications signals are collected from both the imaging mast and a dedicated communications intercept mast, which is either an AN/BRD-7 (on the *Los Angeles* and *Seawolf* classes), an AN/BSD-2 (on the *Virginia* class), or a Multifunction Modular Mast (MMM) (recently fielded on some *Los Angeles*- and *Virginia*-class ships). These masts provide largely the same functionality but with different frequency coverage and localization accuracy.
- The AN/BLQ-10 provides support for specialized, carry-on electronic warfare equipment and personnel.
- The program has adopted an open architecture, incremental development process. Hardware and software updates, referred to as TIs, are fielded every 2 years.
  - TI-08 was the first such upgrade, which added a subsystem to intercept some Low Probability of Intercept (LPI) radar signals.
  - TI-10 has been fielded. It consists of updates to commercial off-the-shelf (COTS) processors and displays, as well as upgrades of the Radar Narrowband to improve reliability and maintainability, improvement of the collection process, and an upgrade for the Improved Communications Acquisition and Direction Finding (ICADF) system.

- TI-12 has been fielded on 688I SSN *Los Angeles*-class submarines. It brings new and more powerful servers; adds some TI-10 capabilities to this class of submarines; and connects directly to the submarine's combat system enclave guard, thus standardizing the cybersecurity process.
- The first TI-14 modernization installations will be completed late FY17 into early FY18, with the first deployment in FY18. TI-14 will be installed on 688I SSNs and new construction *Virginia*-class submarines. It consists of updates to COTS processors and displays, and Electronic Warfare Server First Generation, which provides the Electronic Support System operator and platform decision-makers with improved tactical situational awareness.

Mission

Submarine Commanders use the AN/BLQ-10 electronic warfare support system to provide threat warning information to avoid counter-detection and collision, and to conduct intelligence, surveillance, and reconnaissance in support of fleet or battlegroup objectives.

Major Contractor

Lockheed Martin Mission Systems and Training – Syracuse, New York

Activity

- The Navy completed FOT&E in FY16. The FOT&E was conducted in accordance with a DOT&E-approved test plan.
- In June 2017, the Navy's Operational Test and Evaluation Force published a classified FOT&E report on the AN/BLQ-10 system with the TI-10 upgrade and the MMM.
- In August 2017, DOT&E published a classified FOT&E report on the AN/BLQ-10 system.
- DOT&E removed the AN/BLQ-10 program from oversight in FY17.
- The Navy is conducting ongoing land-based tests with TI-14 and other improvements at the Naval Undersea Warfare Center (NUWC) in Newport, Rhode Island, and at Lockheed Martin's facility in Syracuse, New York. The Navy intends to conduct an at-sea test in December 2017.

Assessment

- The FOT&E of the AN/BLQ-10 with TI-10 was adequate to determine the system's operational effectiveness but not its operational suitability.
- The TI-10 upgrade improves the previous version of the system (TI-08) by increasing the system's ability to intercept communication signals.

- The complete operational effectiveness assessment is discussed in DOT&E's classified FOT&E report.
- DOT&E could not fully assess the operational suitability of AN/BLQ-10 with TI-10. The FOT&E was insufficient to evaluate the Navy's training program and AN/BLQ-10 hardware reliability. Nonetheless, operational testing revealed AN/BLQ-10 training and software reliability problems that should be corrected.

Recommendations

- Status of Previous Recommendations. The Navy has addressed all previous recommendations.
- FY17 Recommendations. The Navy should:
  1. Improve software reliability.
  2. Conduct follow-on operational testing to assess AN/BLQ-10 hardware reliability and the Navy's training program. The complete list of recommendations is addressed in DOT&E's classified FOT&E report.