

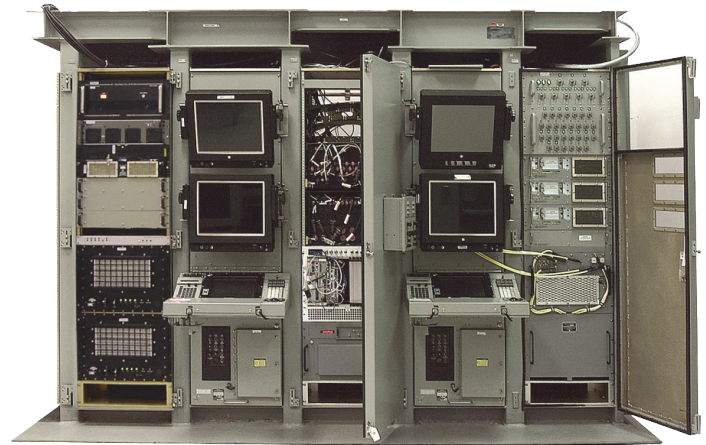
AN/BLQ-10 Submarine Electronic Warfare Support System

Executive Summary

- The Navy operationally tested the AN/BLQ-10 system with the Technical Insertion (TI) 2008 (TI-08) upgrade and the Multifunction Modular Mast (MMM) in October 2012.
- DOT&E issued a classified report on that testing in September 2013 and concluded the TI-08 upgrade improves the system's intercept capability against Low-Probability of Intercept (LPI) radars, and the MMM provides communications signal localization accuracy that would be sufficient for most missions. DOT&E assessed the AN/BLQ-10 system as not operationally effective for use in collection of communications signals.
- DOT&E is working with the Navy to develop a Test and Evaluation Master Plan (TEMP) to support assessment of the AN/BLQ-10 system with the TI-10 upgrade. Testing on the TI-10 version of the system is expected to occur during FY14.

System

- The AN/BLQ-10 system is an electronic warfare support system for U.S. submarines. It provides automatic intercept capability (detection, classification, localization, and identification) for both radar and communications signals. Separate subsystems process radar and communications signals.
- The AN/BLQ-10 processes 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 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 program is adopting an open-architecture, incremental development process. Hardware and software updates,



referred to as TIs, will be fielded every two years. TI-08 was the first such upgrade, which added a subsystem to intercept some LPI radar signals.

- The AN/BLQ-10 provides support for specialized, carry-on electronic warfare equipment and personnel.

Mission

Submarine crews use the AN/BLQ-10 electronic warfare support system whenever the submarine is at periscope depth. Crews use the information provided by AN/BLQ-10 for the following submarine force missions:

- Threat warning to avoid counterdetection and collision
- Determining the number and location of targets for subsequent prosecution
- Conducting 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 TEMP Revision C to cover testing of the TI-08 and TI-10 upgrades to the system.
- After TEMP Revision C was signed, the Navy decided to accelerate the fielding of a new communications intercept algorithm into TI-10. This change will necessitate a new TEMP revision to cover the additional testing required for this capability. The Navy has begun the test design and TEMP revision processes.
- During at-sea developmental and operational testing in October 2012, the Navy assessed the ability of TI-08 to intercept LPI radars and the ability of the MMM to localize communications signals. DOT&E issued a classified report on this testing in September 2013.
- In September 2013, the Navy conducted cybersecurity testing of BLQ-10.

Assessment

- The AN/BLQ-10 system is limited in operational effectiveness. The system detects some radars at long ranges; however, operational testing was inadequate to determine the extent operators can use the AN/BLQ-10 to support submarine missions. The Navy has not yet conducted operational testing against some modern threat radars or appropriate surrogates. The AN/BLQ-10 system is not operationally effective for collecting communications signals due to its inability to automatically detect some signal types.
- The TI-08 upgrade provides improved intercept capability against the intended LPI radars. However, the number of LPI radars is increasing and the Navy will need to develop future upgrades to stay current with newer technology.
- The MMM provides communications localization accuracy that would be sufficient for most submarine missions. Operational testing showed the system did not meet the Navy's established thresholds.
- The most recent operational testing was partially adequate because it provided sufficient data, when supplemented with developmental testing results, to assess the technical performance of the AN/BLQ-10's intercept capabilities. However, the Navy did not conduct testing in accordance with the October 2012 DOT&E-approved test plan.
 - Testing was not adequate to assess the operators' ability to determine counterdetection risks, which is a primary use in submarine operations. In particular, the test plan required a *Ticonderoga* class cruiser to act as a surrogate threat; however, the ship scheduled to participate was unable due to a material casualty and no other ships were available.
 - The submarine's crew did not act realistically to the threat posed by the available P-3C aircraft, which was the only threat surrogate in the test. These problems limited the data available to evaluate the AN/BLQ-10's support of threat avoidance.
- The AN/BLQ-10 is not operationally suitable because the Navy's training system is not sufficient to allow fleet operators to maintain proficiency on the system.

Recommendations

- Status of Previous Recommendations. This is the first annual report for this program.
- FY13 Recommendations. The Navy should:
 1. Reconsider use of Probability of Communications Signal Intercept and Probability of Electronic Signal Intercept in establishing the AN/BLQ-10 system requirements and use measures that address the system's capabilities against each of the signal types.
 2. Develop a more robust training program to increase the proficiency of AN/BLQ-10 operators and maintainers on the communications subsystem.
 3. Avoid conducting developmental testing immediately before operational testing unless measures are in place to prevent degraded operator performance due to desensitization.
 4. Structure future tests to evaluate AN/BLQ-10's support of threat avoidance, rather than limiting them to assessing the technical performance of the system.