

Common Submarine Radio Room

The baseline increment of the Common Submarine Radio Room (CSRR) is operationally effective and operationally suitable. The Initial Operational Test and Evaluation (IOT&E) was adequate and executed in accordance with the Director, Operational Test and Evaluation (DOT&E)-approved test plan.

System Overview

The Navy intends for the CSRR to provide a common communication system across all submarine classes. The CSRR is an incremental acquisition program. The Navy is installing the current (baseline) increment on four of five current submarine classes, but has delayed installation of the CSRR on the fifth class (*Los Angeles* class SSN) until FY15 due to funding constraints. Future increments of the CSRR are intended to address obsolescence issues and add new communications capabilities as they mature.

The CSRR integrates modern antennas, radios, cryptographic equipment, and messaging systems for control and management from a single workstation (on some submarine classes, dual workstations are provided). The CSRR provides the frequency coverage and waveforms to communicate on existing submarine radio frequency external communications circuits and the ability to integrate future circuits as they become available.

A single operator using the central control terminal can operate the CSRR. Although not required, a second operator is often utilized in practice to assist with message dissemination and multiple simultaneous communication requirements.

Test Adequacy

The operational testing of the CSRR was adequate to support an assessment of the system's operational effectiveness and suitability. The Navy's operational testing and evaluation agency (OTA) executed the IOT&E in accordance with the DOT&E-approved test plan. The OTA conducted separate operational testing on a *Seawolf* class SSN, an SSBN, and two SSGNs. The *Virginia* class SSN variant of the CSRR will be tested in 2008 as part of overall *Virginia* class platform IOT&E; this is considered an upgraded version of the current baseline system. The Navy also conducted a five-day maintenance demonstration at the Trident Training Facility in Kings Bay, Georgia. Although there were several minor limitations in test execution, these limitations did not prevent an adequate evaluation of CSRR effectiveness and suitability.

Operational Effectiveness

The CSRR is operationally effective. A submarine equipped with the CSRR is able to effectively communicate in support of its assigned mission. All Navy-specified performance requirements were met.

Submarines with the CSRR demonstrated the ability to reliably establish communications in support of their assigned mission, with an overall success rate of 97 percent. When problems were encountered, the submarine crew was able to establish alternate circuits to support the submarine mission. The testers evaluated 100 percent of transmitted and received data elements (totaling over 1,000 individual data elements) as usable without the need for retransmission. Also, all data elements were routed correctly to the appropriate enclave within the CSRR and to appropriate external interfaces. The CSRR architecture allowed rapid reconfiguration of the radio room to support changing needs. The CSRR supported simultaneous operation of up to 12 separate communications circuits on the SSN, 13 circuits on SSGN, and 18 circuits on SSBN, sufficient for all submarine missions.

As the Navy transitions to internet protocol (IP) submarine broadcasts and becomes increasingly reliant on IP products (e.g., web browsing, E-mail, and chat rooms), Extremely High Frequency (EHF) connectivity has become increasingly important to submarine operations. The CSRR adequately implements EHF by integrating the EHF Follow-On Terminal (FOT), developed separately and implemented on both submarines and surface platforms. However, throughout the testing, it became apparent that successful EHF communications were highly dependent upon satellite availability and adequate shore support. The testers observed, and the crews reported, frequent problems conducting EHF communications.

The Navy's EHF architecture is not optimized to support rapid restoration of communications following an inadvertent interruption. Shore EHF terminals do not employ circuit-checking protocols to periodically determine if user stations remain connected; as a result, the terminals consider the station already logged on and will reject attempts to re-establish communication. Testers observed interruption of EHF communications on multiple occasions during testing. Circuit restoration was delayed and required the ship to conduct troubleshooting with the shore communications station, since the shore EHF terminal remained blocked until reset by shore personnel.

ANNEX B - CONGRESSIONAL REPORTS

Operational Suitability

The CSRR is operationally suitable. In operational testing, the CSRR was reliable and required infrequent repairs. The system was available for mission execution over 99 percent of the time, exceeding the established requirement of 92 percent. In total, the CSRR operated for over 1,000 hours on four different platforms with no hardware-related operational mission failures and only four software-related operational mission failures. The software failures were rapidly corrected with system restarts. During the separate maintenance demonstration, trained operators rapidly located and corrected faults inserted by the testers. The CSRR was compatible and interoperable with other ship's systems. Although some improvements are warranted, CSRR design, training, and documentation supported operations and maintenance by fleet personnel.

Recommendations

The CSRR is operationally effective and operationally suitable. The Navy should address the following issues:

Operational Effectiveness

- Upgrade the CSRR design to allow SSBNs to simultaneously operate more than one Very Low Frequency antenna with omni-directional capability (this operationally-relevant capability existed in legacy SSBN radio rooms).
- Re-evaluate the EHF communications infrastructure in light of the increased importance of EHF communications to submarine operations. Ensure the satellite and shore support infrastructure is sufficiently robust to support efficient EHF communications by submarines at sea.
- Optimize the EHF architecture to allow submarines to rapidly restore communications following an inadvertent interruption.
- Consider outfitting *Ohio* class SSGNs with Submarine High Data Rate masts that reach the same height as *Ohio* class SSBNs.
- Complete certification of the SSGN and SSBN for sensitive information and conduct IOT&E of the CSRR sensitive information communication capabilities¹.
- Implement procedures to ensure antivirus software virus definition files are updated regularly for CSRR systems¹.

Operational Suitability

- Incorporate a second AN/UYQ-70 central control terminal for SSNs¹.
- Conduct IOT&E to evaluate the susceptibility of CSRR equipment to damage associated with inadvertent interruption of power.
- Consider a design change for future CSRR increments to provide power to EHF components from vital electrical switchboards.
- Improve the shore CSRR shore training infrastructure to support long-term crew training requirements.

¹ These issues are adequately addressed in the Navy's near-term plans for the CSRR program.