

Surface Electronic Warfare Improvement Program (SEWIP) Block 2



The Navy's Operational Test and Evaluation Force (OPTEVFOR) commenced cyber survivability evaluation of Surface Electronic Warfare Improvement Program (SEWIP) Block 2 in FY23 with testing on the SLQ-32A(V)6 variant aboard USS *Zumwalt* (DDG 1000) and the SLQ-32B(V)6 variant in a laboratory-based test facility representing the USS *Gerald R. Ford* (CVN 78) configuration. OPTEVFOR conducted no operational testing of effectiveness and suitability in FY23 but plans completion of SEWIP Block 2 FOT&E in FY24. In the FY21 Annual Report, operational effectiveness and suitability testing was expected to be accomplished in FY22; this testing has been delayed two years due to ship and other test resource availability. DOT&E expects to publish a classified report in FY25 upon completion of FOT&E.

SYSTEM DESCRIPTION

SEWIP is an electromagnetic warfare system that detects, identifies, and tracks threat anti-ship cruise missiles and targeting radars. SEWIP Block 2 incorporates a new antenna system, enhanced processing capabilities, and a High Gain High Sensitivity subsystem to improve battlefield situational awareness. Some variants of SEWIP Block 2 incorporate additional software, known as the Soft Kill Coordination Subsystem, to improve combat system integration with non-kinetic effects, such as decoys, to defeat aerial threats.

MISSION

Navy commanders have used the SLQ-32 electronic warfare system to perform anti-ship missile defense (ASMD), counter-targeting, and counter-surveillance since the 1970s. SEWIP Block 2 upgrades the electromagnetic support capabilities and integrates more closely with the combat system to improve ASMD against emerging threats.

PROGRAM

SEWIP Block 2 is an Acquisition Category II program that entered Milestone C in January 2013. SEWIP Block 2 completed IOT&E in FY16 and the Navy approved full-rate production in September 2016.

SEWIP Block 2 has three variants, each of which have distinct hardware and software suites:

- SLQ-32(V)6 on *Arleigh Burke*-class destroyers with the Aegis combat system
- SLQ-32A(V)6 on *Zumwalt*-class destroyers
- SLQ-32B(V)6 on *Gerald R. Ford*-class aircraft carriers

SEWIP Block 2's FOT&E assesses the following:

- System upgrades since IOT&E
- Combat system integration and decoy integration capabilities of the Soft Kill Coordination Subsystem for the variant fielded on Aegis destroyers
- Integration of each SEWIP Block 2 variant with its corresponding combat system: the Aegis Combat System on the *Arleigh Burke* class, the Total Ship Computing Environment (TSCE) combat system on the *Zumwalt* class, and the Ship Self-Defense Combat System (SSDS) on the *Gerald R. Ford* class

DOT&E expects to submit a classified FOT&E report in FY25 after completion of SEWIP Block 2 FOT&E.

» MAJOR CONTRACTOR

- Lockheed Martin Corporation – Syracuse, New York

TEST ADEQUACY

OPTEVFOR evaluated the cyber survivability of SLQ-32A(V)6 aboard USS *Zumwalt* (DDG 1000) in February 2023 and SLQ-32B(V)6 in a laboratory-based test facility configured for the *Gerald R. Ford* class in July 2023. The Navy conducted both test events in accordance with DOT&E-approved test plans and with observation by DOT&E. The DDG 1000 test supports evaluation of SLQ-32A(V)6 integration with the TSCE combat system. Although the laboratory test should support evaluation of SLQ-32B(V)6 integration with the SSDS combat system, OPTEVFOR has not yet accredited the laboratory version of SLQ-32B(V)6 as representative of the *Gerald R. Ford*-class configuration due to pending data from evaluation on USS *Gerald R. Ford* (CVN 78) scheduled in 3QFY24. OPTEVFOR plans to conduct SLQ-32(V)6 system scans during *Arleigh Burke*-class destroyer platform testing in 3QFY24 to support its cyber survivability assessment and is in development of the test plan. As documented in the FY21 Annual Report, this cyber survivability testing was expected to be accomplished in 1QFY23, but it has since been delayed due to ship and other test resource availability.

OPTEVFOR conducted no testing for assessing effectiveness and suitability of SLQ-32(V)6 in FY23 but expects to conduct this evaluation in FY24. DOT&E approved a test plan for assessing effectiveness and suitability

of SLQ-32A(V)6 in July 2023. However, the scheduled test was postponed due to pilot training and safety concerns associated with the aircraft supporting tracking events and the resultant inability to conduct the test as planned. The Navy is working through these concerns and now plans to execute this test of SLQ-32A(V)6 in FY24. No additional test for assessing effectiveness and suitability of SLQ-32B(V)6 is planned.

While SEWIP Block 2 FOT&E has included additional threat emulations from those available in IOT&E, several stressing threats that the system could encounter are not available for test. Models for several of these threats are developed but the Navy has yet to fund required programming of these threats within threat emulators for test. Additionally, adequate evaluation of SEWIP Block 2 depends upon data from SLQ-32(V)6 (*Arleigh Burke*-class destroyers) and SLQ-32A(V)6 (*Zumwalt*-class destroyers) test events in a more comprehensive and complex electromagnetic spectrum environment.

PERFORMANCE

» EFFECTIVENESS

Not enough data are yet available to determine operational effectiveness of SEWIP Block 2 due to remaining test requirements and ongoing data analysis. DOT&E expects to deliver a classified report for SEWIP Block 2 in FY25 after completion of remaining FOT&E.

» SUITABILITY

Not enough data are yet available to determine operational suitability of SEWIP Block 2. However, preliminary data indicate SEWIP Block 2 fails to meet its reliability and operational availability requirements. SEWIP Block 2 reliability failure rates are similar to those reported in the SEWIP Block 2 IOT&E Report of September 2016. DOT&E expects to deliver a classified report for SEWIP Block 2 in FY25 after completion of remaining FOT&E.

» SURVIVABILITY

Not enough data are yet available to determine cyber survivability of SEWIP Block 2 due to remaining tests on SLQ-32(V)6 and SLQ-32B(V)6. DOT&E expects to deliver a classified report for SEWIP Block 2 in FY25 after completion of remaining FOT&E.

evaluation of SLQ-32B(V)6 and accredit its representation during the laboratory-based test event in FY23.

4. Identify and schedule test assets to complete remaining tests on SLQ-32(V)6 and SLQ-32A(V)6.

RECOMMENDATIONS

The Navy should:

1. Fund the programming of more stressing threats within threat emulators and incorporate into remaining SEWIP Block 2 test events as the emulations become available.
2. Include a complex electromagnetic environment in remaining SEWIP Block 2 test events as previously recommended in the FY21 Annual Report.
3. Identify availability of USS *Gerald R. Ford* in FY24 to complete cyber survivability