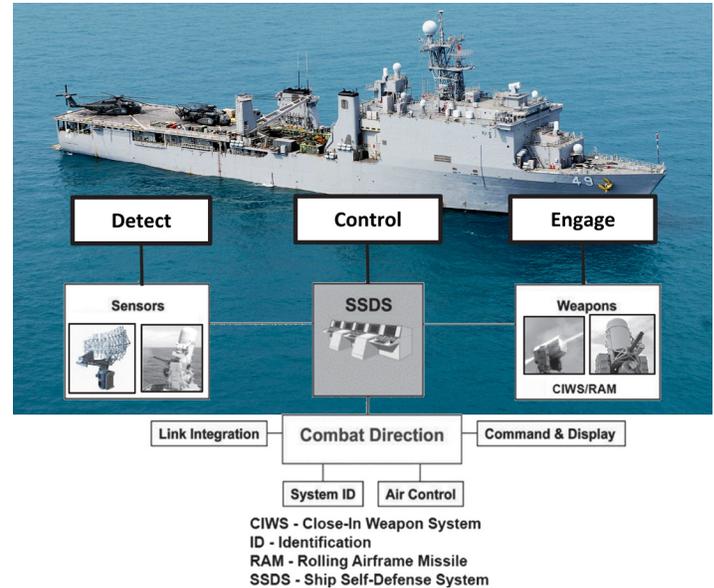


## Ship Self-Defense for LSD 41/49

### Executive Summary

- The Navy's Operational Test and Evaluation Force (OPTEVFOR) conducted one missile firing exercise in December 2016 from the Self-Defense Test Ship (SDTS) on the Naval Air Warfare Center – Weapons Division, Point Mugu, California, test range. This test was the first of a series of nine planned missile/gun firings to operationally test the self-defense capabilities of the *Whidbey Island* (LSD 41)-class and *Harpers Ferry* (LSD 49)-class amphibious ships.
- DOT&E provided a classified Early Fielding Report for the Ship Self-Defense capability of the LSD 41/49 ship class to Congress in November 2017 because the Navy deployed three LSD 41/49 class ships in FY17 without completing the planned operational testing. The report stated that there is a paucity of operational test results to support an evaluation of the self-defense capabilities of LSD 41/49-class ships equipped with the Ship Self-Defense System (SSDS) MK 2 Mod 5 Combat System, and that the Navy is deploying those ships with unknown self-defense capabilities.



### System

- Several legacy combat system elements (including the primary self-defense radars, AN/SPS-49A(V)1, and Close-in Weapon System) and three acquisition programs address surface ship self-defense for LSD 41/49-class ships. The three acquisition programs are:
  - SSDS
  - Rolling Airframe Missile (RAM)
  - Surface Electronic Warfare Improvement Program (SEWIP)

### SSDS

- SSDS is a local area network that uses open computer architecture and standard Navy displays to integrate a surface ship's sensors and weapons systems to provide an automated detect-track-engage sequence for ship self-defense.
- SSDS MK 1 is the legacy command and control system for LSD 41/49-class ships.
- SSDS MK 2 has six variants:
  - Mod 1, used in *Nimitz* (CVN 68)-class aircraft carriers
  - Mod 2, used in *San Antonio* (LPD 17)-class amphibious ships
  - Mod 3, used in *Iwo Jima* (LHD 7)-class and *Makin Island* (LHD 8)-class amphibious ships
  - Mod 4, used in *America* (LHA 6)-class amphibious ships
  - Mod 5, used in *Whidbey Island* (LSD 41)-class and *Harpers Ferry* (LSD 49)-class amphibious ships
  - Mod 6, in development for *Gerald R. Ford* (CVN 78)-class aircraft carriers

### RAM

- The RAM, jointly developed by the United States and the Federal Republic of Germany, provides a short-range, lightweight self-defense system to defeat anti-ship cruise missiles (ASCMs).
- There are three RAM variants:
  - RAM Block 0 uses dual-mode, passive radio frequency/infrared guidance to home in on ASCMs.
  - RAM Block 1A adds infrared guidance improvements to extend defense against ASCMs that do not emit radar signals.
  - RAM Block 2 adds kinematic and guidance improvements to extend the capability of RAM Block 1A against newer classes of ASCM threats.

### SEWIP

- SEWIP is an evolutionary development program providing block upgrades to the AN/SLQ-32 electronic warfare system to address critical capability, integration, logistics, and performance deficiencies.
- There are three major SEWIP block upgrades:
  - SEWIP Block 1, used on LSD 41/49-class ships, replaced obsolete parts in the AN/SLQ-32 and incorporated a new, user-friendly operator console, an improved electronic emitter identification capability, and an embedded trainer.
  - SEWIP Block 2 incorporated a new receiver antenna system intended to improve the AN/SLQ-32's passive electronic warfare capability.

# FY17 NAVY PROGRAMS

- SEWIP Block 3 is in development and will incorporate a new transmitter antenna system intended to improve the AN/SLQ-32's active electronic warfare capability.
- SEWIP-improved AN/SLQ-32 as the primary electronic warfare sensor and soft-kill weapons system for air defense (to include self-defense) missions

## Mission

- Naval Component and Unit Commanders use SSDS, RAM, SEWIP, and other legacy systems, to accomplish ship self-defense missions.
- Naval surface units use the:
  - SSDS to provide automated and integrated detect to engage ship self-defense capabilities against ASCM, air, and surface threats
  - RAM to provide a short-range hard-kill engagement capability against ASCM threats

## Major Contractors

- SSDS (all variants): Raytheon – San Diego, California
- RAM (all variants): Raytheon Missile Systems – Tucson, Arizona; RAMSys – Ottobrunn, Germany
- SEWIP
  - Block 1: General Dynamics Advanced Information Systems – Fair Lakes, Virginia
  - Block 2: Lockheed Martin – Syracuse, New York
  - Block 3: Northrop Grumman – Baltimore, Maryland

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## Activity

- OPTEVFOR conducted one missile firing exercise in December 2016 from the SDTS on the Naval Air Warfare Center – Weapons Division test range in accordance with a DOT&E-approved test plan. This test was the first of nine planned missile firings to operationally test the self-defense capability of the LSD 41/49-class amphibious ships. Results of the missile firing test are classified.
- DOT&E provided a classified SSDS MK 2 Mod 5 early Fielding Report to Congress in November 2017 because the Navy deployed three LSD 41/49-class ships in FY17 without completing the planned operational testing.
- The Navy plans to conduct only one LSD 41/49-class missile firing exercise from the SDTS in FY18. There are no plans for additional missile firings before FY20. Five additional LSD 41/49-class ships are scheduled to deploy in FY19 and FY20.
- The first SSDS MK 2 Mod 5-equipped LSD 41/49 ship deployed in late 2016. Two SSDS MK 2 Mod 5-equipped LSD 41/49 ships deployed in FY17. At least one more LSD 41/49 deployment is planned in FY18.

## Assessment

- With only one of the nine required missile/gun firing operational tests completed, there is a paucity of operational test results to support an evaluation of the self-defense capabilities of the LSD 41/49-class ships.
- SDTS scheduling constraints are delaying completion of the remaining eight required missile/gun firing operational tests until FY20 at the earliest. By that time, 8 of the 12 LSD 41/49 ships equipped with the SSDS MK 2 Mod 5 Combat System will have deployed.
- The Navy is deploying LSD 41/49 ships with uncharacterized self-defense capabilities.

## Recommendations

- Status of Previous Recommendations. The Navy has not addressed the previous recommendation to complete all planned operational tests of the LSD 41/49 ship class equipped with the SSDS MK 2 Mod 5 Combat System as soon as possible and prior to further ship deployments.
- FY17 Recommendations. None.