Close-in Weapon System (CIWS) – SeaRAM Variant

Executive Summary

- The Navy tested SeaRAM on the Self-Defense Test Ship (SDTS) at the Pacific Test Range, Pt Mugu, California, from December 2015 to March 2016 and on USS *Porter* (DDG 78) at the Spanish sea range, Rota, Spain, in March 2016. None of these tests were conducted with DOT&E-approved operational test plans or conducted by the Navy's Commander, Operational Test and Evaluation Force since SeaRAM is not a formal acquisition program with approved requirements documents or milestone decisions.
- DOT&E published a classified report to Congress in December 2016 since SeaRAM was deployed on operational DDG 51-class ships without having conducted any operational testing. That report stated that, based on the results of the Navy testing, although SeaRAM has demonstrated some capability against anti-ship cruise missile (ASCM) threats, the lack of ASCM surrogate targets to adequately represent advanced ASCM threats combined with the paucity of test data does not support a meaningful and quantitative assessment of SeaRAM's ability to provide the DDG 51 class with an adequate self-defense against threat ASCMs.

System

- SeaRAM is a non-acquisition program that is a standalone self-defense system composed of the Close-in Weapon System (CIWS) radar, an electronic warfare sensor suite, and a modified CIWS command/decision capability combined with an 11-round Rolling Airframe Missile (RAM) launcher (instead of the CIWS 20 mm gun). It provides a short-range, lightweight, self-defense system to defeat ASCMs.

- SeaRAM, as used on selected DDG 51-class ships, can launch the RAM Block 2 that incorporates changes to improve its kinematic capability and its capability to guide on certain types of ASCM radio frequency threat emitters in order to defeat newer classes of ASCM threats

Mission

Commanders of naval surface forces use SeaRAM to provide a short-range, hard-kill engagement capability against ASCM threats for ship self-defense.

Major Contractor

Raytheon Missile Systems – Tucson, Arizona

Activity

- The Navy tested SeaRAM on the SDTS at the Pacific Test Range, Pt Mugu, California, from December 2015 to March 2016, and on USS *Porter* (DDG 78) at the Spanish sea range, Rota, Spain, in March 2016. None of these tests were conducted with DOT&E-approved operational test plans or conducted by the Navy's Commander, Operational Test and Evaluation Force since SeaRAM is not a formal acquisition program with approved requirements documents or milestone decisions.
- DOT&E published a classified Early Fielding Report to Congress in December 2016 since SeaRAM was deployed on operational DDG 51-class ships without having conducted any operational testing.

Assessment

- The classified December 2016 DOT&E report to Congress stated that, based on the results of the Navy testing, although SeaRAM has demonstrated some capability against ASCM threats, the lack of ASCM surrogate targets to adequately represent advanced ASCM threats combined with the paucity of test data does not support a meaningful and quantitative assessment of SeaRAM's ability to provide the DDG 51 class with an adequate self-defense against threat ASCMs.
- An adequate set of DOT&E-approved SeaRAM operational tests against a broader, more threat representative set of ASCM threat surrogates are required to demonstrate that the DDG 51-class destroyer's other defensive weapons do not degrade SeaRAM's effectiveness and to fully assess

SeaRAM's ability to effectively defend DDG 51-class destroyers. Along with additional missile firings, these tests would involve modeling and simulation using an end-to-end model of the DDG 51-class destroyer's combat system that could be accredited for operational testing.

- Further details of SeaRAM's demonstrated capability to provide the DDG 51-class destroyer with an adequate self-defense against threat ASCMs are classified.
- The SeaRAM electronic warfare suite prevents SeaRAM from utilizing the RAM Block 2 missile to its full capability.
- Due to the Navy's inability to develop a Multi-Stage Supersonic Target (MSST), no assessment of SeaRAM's capability against MSST-like ASCM threats is possible.

Recommendations

- Status of Previous Recommendations. This is the first annual report for this program.
- FY16 Recommendations. The Navy should:
  1. Plan and program funds for an adequate set of SeaRAM operational tests against a broader set of ASCM threats (to include a phase of modeling and simulation) to fully assess SeaRAM's ability to effectively defend DDG 51-class destroyers. The missile firing portion of these tests could be conducted on an Aegis-equipped SDTS.
  2. Develop threat surrogate aerial targets that adequately represent advanced ASCM threats.
  3. Upgrade the SeaRAM electronic warfare system so that SeaRAM may take full advantage of the RAM Block 2 missile capabilities.
  4. Develop an MSST adequate for use in OT&E. The Test Resources section of this Annual Report provides further details.