

## Ship Self-Defense System (SSDS)

### Executive Summary

- The Ship Self-Defense System (SSDS) Mark 2 integration of sensor and weapons systems enhances ship self-defense and battle force command/control. However, the system is not yet operationally effective or operationally suitable.
- The Navy must conduct additional operational testing to demonstrate the correction of significant remaining deficiencies with SSDS Mark 2 and associated combat system elements.

### System

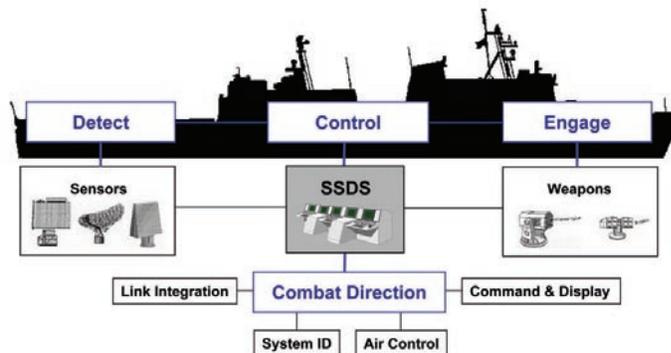
- SSDS is a local area network that uses open computer architecture and standard Navy displays to integrate a surface ship's sensors and weapon systems to automate the detect-track-engage sequence for air defense.
- SSDS Mark 1 is the command and control system for LSD 41/49 class ships.
- SSDS Mark 2 has four variants:
  - The Mod 1 is used in CVN 68 class aircraft carriers.
  - The Mod 2 is used in LPD-17 class amphibious ships.
  - The Mod 3 is used in LHD 1 class amphibious ships.
  - The Mod 4 is in development for LHA 6 class amphibious ships.
  - A SSDS Mark 2 Mod is in development for CVN 78 class aircraft carriers.

### Mission

Navy surface forces use the SSDS to provide automated engagement capabilities for faster and more effective

### Activity

- The Commander, Operational Test and Evaluation Force (COTF) conducted FOT&E of the SSDS Mark 2 Mod 1 (CVN variant) on USS *Nimitz* (CVN 68) in February-March 2009 in accordance with a DOT&E-approved test plan. Lack of Evolved SeaSparrow Missile (ESSM) assets limited test events to manned aircraft tracking exercises and prevented COTF from completing test events that included ESSM firings. In addition, reduced availability of required Fleet assets delayed completion of SSDS Mark 2 Mod 1 operational testing. Testing also included an early assessment of SSDS Mark 2 Mod 1 information assurance capabilities. COTF has not yet issued a report on the operational test results from the February-March 2009 testing. USS *Nimitz* deployed in May 2009. The next scheduled SDSS Mark 2 Mod 1 operational test is scheduled for mid-FY10 with USS *Carl Vinson* (CVN 70).



accomplishment of self-defense missions. Maritime Commanders intend to use:

- Mark 1 and Mark 2 to provide automated and integrated detect-to-engage capability against anti-ship cruise missiles (ASCM)
- Mark 2 to provide faster and more effective command and control for multiple warfare areas

### Prime Contractor

- Raytheon, San Diego, California

- COTF continued to conduct FOT&E of the SSDS Mark 2 Mod 2 (LPD-17 variant) on the Self-Defense Test Ship in December 2008 in accordance with a DOT&E-approved test plan. Aerial target failures prevented COTF from completing all of the planned test events. The next SSDS Mark 2 Mod 2 operational test is scheduled for early FY10.
- COTF issued a report verifying correction of 12 major SSDS Mark 2 combat system deficiencies identified during previous operational tests.

### Assessment

- The completed SSDS Mark 2 Mod 1 (CVN variant) operational tests show that the system remains not operationally effective and not suitable. Although correction of the 12 major combat system deficiencies has substantially

improved the system's performance, testing has revealed continued deficiencies with weapon employment timelines and training as well as sensor coverage and system track management deficiencies associated with combat system elements integrated with the SSDS Mark 2 Mod 1.

- SSDS Mark 2 Mod 2 (LPD-17 variant) operational tests have not demonstrated correction of previously uncovered deficiencies with sensor performance in the LPD-17 Advanced Enclosed Mast structure, vulnerabilities to certain ASCM threats, weapon performance in scenarios with potential fratricide, and 10 remaining major combat system deficiencies. Additionally, newly identified reliability deficiencies with combat system elements integrated with the SSDS Mark 2 Mod 2 will adversely affect the ability of the SSDS Mark 2 Mod 2 to fulfill its primary ship self-defense mission.
- The number of high severity software trouble reports associated with major elements of the SSDS Mark 2 combat system has been significantly reduced.
- Software reliability of the SSDS Mark 2 has been significantly improved.

## Recommendations

- Status of Previous Recommendations. The Navy has satisfactorily completed three, partially addressed four, and not addressed five of valid previous recommendations.
- FY09 Recommendations. The Navy should:
  1. Assign a high priority to demonstrating, with adequate operational testing, corrections of identified major

deficiencies with the SSDS Mark 2 Mod 1 and its integrated combat system elements to preclude further CVN deployments with ineffective and unsuitable SSDS Mark 2 Mod 1 systems.

2. Assign a high priority to demonstrating, with adequate operational testing, corrections of identified major deficiencies with the SSDS Mark 2 Mod 2 and its integrated combat system elements to preclude further LPD-17 class deployments with deficient SSDS Mark 2 Mod 2 systems.
3. Implement the Navy's Program Executive Office for Integrated Warfare Systems plan for more robust, end-to-end systems engineering and associated developmental/operational testing of SSDS-based combat system elements.
4. Optimize SSDS Mark 2 weapon employment timelines to maximize weapon probability of kill.
5. Ensure Fleet assets identified in operational test plans are available for SSDS Mark 2 Mod 1 operational tests planned for FY10.
6. Ensure targets that represent subsonic sea-skimming and supersonic high-diving threats are available for SSDS Mark 2 Mod 1 operational tests planned for FY10.
7. Ensure adequate funding is programmed for procurement of Threat D targets for SSDS Mark 2 operational testing in FY14.
8. Ensure adequate funding is programmed for development and procurement of a threat representative anti-ship ballistic missile target for SSDS Mark 2 operational testing in FY14.