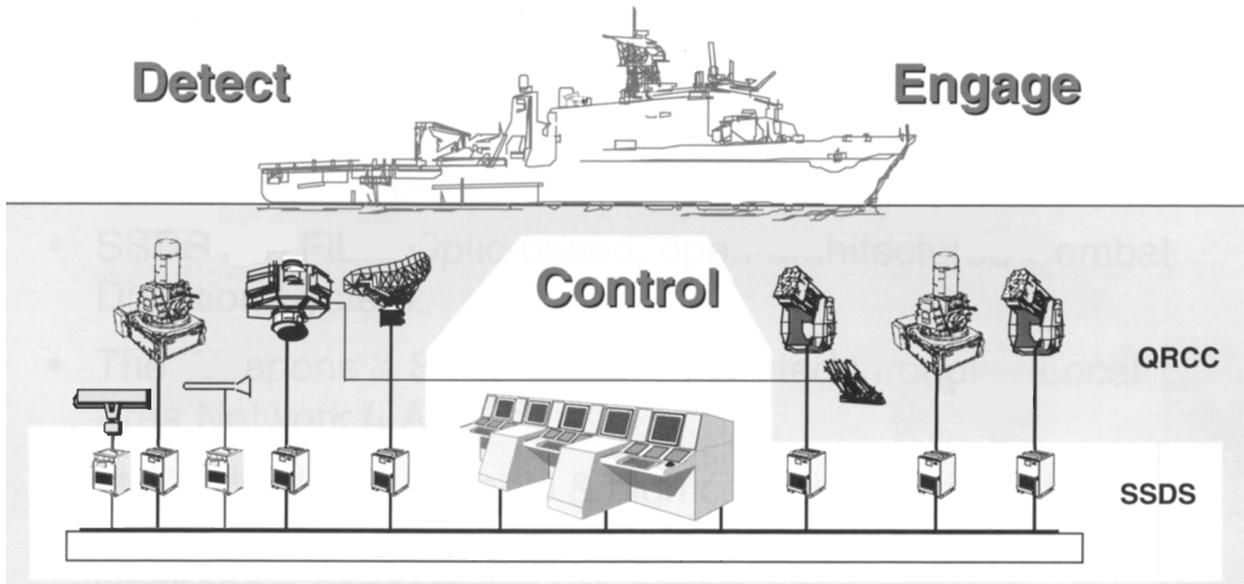


SHIP SELF DEFENSE SYSTEM (SSDS)



Navy ACAT II Program

Total Number of Systems:	58
Total Program Cost (TY\$):	\$823.2M
Average Unit Cost (TY\$):	\$10.0M
Full-rate production:	FY98

Prime Contractor

Raytheon Systems Company
 Naval and Maritime Systems,
 San Diego, CA

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The principal air threat to U.S. naval surface ships is a variety of highly capable Anti-Ship Cruise Missiles (ASCMs). These include sub-sonic (Mach 0.9) and supersonic (Mach 2+), low altitude ASCMs. Detection, tracking, assessment, and engagement decisions must be accomplished to defend against these threats, with the duration from initial detection of an ASCM to its engagement with weapons typically on the order of a minute or less. SSDS is designed to accomplish these defensive actions.

With radars and anti-air weapons for self-defense of today's amphibious ships and aircraft carriers installed as standalone systems, considerable manual intervention is required to complete the detect to engage sequence against ASCMs. The Ship Self Defense System (SSDS) is designed to expedite that process. SSDS, consisting of software and commercial off-the-shelf hardware, integrates radar systems with anti-air weapons, both *hardkill* (missile systems and rapid fire gun systems) and *softkill* (decoys). SSDS includes embedded doctrine to provide an integrated detect-through-engage capability, with options ranging from use as a tactical decision aid (up to the point of recommending when to engage with specific systems) to use as an automatic weapon system to respond with hardkill and softkill systems (as targets become engageable.) Although SSDS will not improve capability of individual sensors, it enhances target tracking by integrating the inputs from several different sensors to form a composite track. For example, SSDS will correlate target detections from individual radars, the electronic support measures system (radar warning receiver), and the identification friend or foe system, combining these to build composite tracks on targets while identifying and prioritizing threats. Similarly,

SSDS will not improve capability of individual weapons, but should expedite the assignment of weapons for threat engagement and provide a "recommend engage" display for operators, or if in automatic mode, initiate weapons firing, ECM transmission, chaff or decoy deployment, or some combination of these.

SSDS integrates previously "standalone" sensor and engagement systems for aircraft carriers and amphibious warfare ships, thereby supporting the *Joint Vision 2020* concept of *full-dimensional protection* by providing a final layer of self-protection against air threat "leakers" for individual ships. By ensuring such protection, SSDS contributes indirectly to the operational concept of *precision engagement*, in that strike operations against targets are executed from several of the platforms receiving SSDS.

BACKGROUND INFORMATION

A successful at-sea demonstration of SSDS was conducted with an amphibious ship (LSD-41) in June 1993 as a proof-of-concept exercise at the direction of Congress. Milestone II was conducted in May 1995. Total procurement consists of 58 units, with 48 slated for amphibious ships and aircraft carriers and ten supporting training and engineering development. LRIP consisted of four units. The LRIP decision in late FY96 was supported by an OA conducted by COMOPTEVFOR. OPEVAL of SSDS Mark 1 was conducted during June 1997, in accordance with a DOT&E-approved plan and TEMP to support the B-LRIP decision for procurement of SSDS. Based on OPEVAL results, SSDS is operationally effective against sub-sonic, low altitude ASCMs, and is operationally suitable. The Navy acquisition decision authority granted approval for full production in March 1998. Planning is underway for an upgrade of SSDS to the Mark 2 configuration, which will incorporate functionality of the Advanced Combat Direction System (ACDS) Block 1 and provide the interface for integration with the Cooperative Engagement Capability. FOT&E of Mark 1 was conducted onboard the remotely controlled Self Defense Test Ship during FY99 at the Naval Air Warfare Center, Weapons Division Sea Range at Point Mugu, CA. A separate phase for examining operational suitability issues will be conducted in FY01.

TEST & EVALUATION ACTIVITY

Mark 1. There was no formal T&E of Mark 1 in FY00.

Mark 2. Activity consisted of further definition of the overall T&E program.

TEST & EVALUATION ASSESSMENT

Mark 1. As a result of FY97 OPEVAL and FY99 FOT&E, Mark 1 is considered operationally effective against most current ASCM raids. It is operationally suitable, although improvement is still required in training and documentation, and the suitability portion of the FOT&E conducted in FY99 remains to be tested (expected to occur about mid-FY01). As a result of the decision to upgrade to Mark 2, the Mark 1 is installed in ships of the LSD 41 class only. SSDS Mark 1 FOT&E must include concurrent testing with the Rolling Airframe Missile Helicopter-Aircraft-Surface mode.

Mark 2. The proposed T&E program includes a land-based test phase at Wallops Island, VA, and at-sea phases on two aircraft carriers and an LPD 17 class ship. Because it is to incorporate ACDS

Block 1 functionality, SSDS Mark 2 will require assessment of performance in different warfare areas than Block 1. These include Surface, Strike, Amphibious, and other warfare areas. Further, the Air Warfare area T&E requires an additional phase to assess ship self-defense against ASCMs. This requires Mark 2 integrating the sensor and engagement sub-systems of the applicable ship class combat systems while engaging ASCMs or acceptable surrogates as targets. Since these are short-range air defense systems, safe and effective testing requires use of a self defense test ship capable of being remotely operated during operationally realistic ship air defense scenarios. Results of these tests will be used to validate M&S to predict the Probability of Raid Annihilation (PRA) for various combat systems. PRA is a ship air (self) defense requirement, where a raid constitutes an attack by anti-ship cruise missiles. This OT&E of SSDS Mark 2 should be conducted concurrently with the phases of self defense test ship testing that will be required of the combat systems for the applicable ship classes: LPD 17, CVN 76, CVN 77, CVN(X), DD 21, and follow-on classes that have a PRA requirement. SSDS Mark 2 OT&E must include concurrent testing with the Rolling Airframe Missile Helicopter-Aircraft-Surface mode.

