

Standard Missile-6 (SM-6)

Executive Summary

- The performance deficiency discovered during IOT&E and outlined in the classified Standard Missile-6 (SM-6) IOT&E report of May 2013 remains unresolved and continues to affect DOT&E's final assessment of effectiveness.
 - The Navy is assessing several options for a solution, each with varying degrees of complexity. A primary concern is to ensure the solution causes no degradation to the existing SM-6 performance envelope.
 - The Navy plans to incorporate these changes in Block I (BLK I) and Block IA (BLK IA) production variants in FY16.
- Upon completion of the current phase of SM-6 FOT&E, the Navy will have conducted testing that will allow an assessment of the SM-6 Capability Production Document performance requirement for interoperability.
- In FY16, the Navy expects to demonstrate the maximum range Key Performance Parameter (KPP) during SM-6 FOT&E and Aegis Baseline 9 operational testing as well as the launch availability KPP.
- The Navy commenced developmental testing of pre-planned product improvements to the SM-6 BLK I missile in FY14; these improvements are the SM-6 BLK IA configuration. A successful, pre-production developmental flight test (Guidance Test Vehicle-1 (GTV-1)) occurred in FY14. The Navy successfully conducted a second GTV mission (GTV-2) in FY15. The Navy plans to conduct a final SM-6 BLK IA GTV mission (GTV-3) in FY16. Operational testing of the SM-6 BLK IA is planned for FY16/17.
- The Navy conducted seven SM-6 BLK I missile tests during FY15. Of the planned launches, two of three successfully supported FOT&E with Aegis Baseline 9; one test resulted in a missile failure-to-launch (dud/misfire); one successfully supported Naval Integrated Fire Control – Counter Air (NIFC-CA) From-the-Sea (FTS) Increment 1 capability; and three successfully supported Missile Defense Agency (MDA) Sea-Based Terminal (SBT) testing.
- NIFC-CA FTS Increment 1 test events have demonstrated a basic capability, but its effectiveness under operationally realistic conditions is undetermined.
- DOT&E continues to monitor the uplink/downlink antenna shroud reliability during FOT&E. There are no recorded failures in testing since IOT&E in FY11.

System

- SM-6 is the latest evolution of the Standard Missile family of fleet air defense missiles.
- SM-6 is employed from cruisers and destroyers equipped with the Aegis combat systems.



- The SM-6 seeker and terminal guidance electronics derive from technology developed in the Advanced Medium-Range Air-to-Air Missile program.
- SM-6 retains the legacy Standard Missile semi-active radar homing capability.
- SM-6 receives midcourse flight control from the Aegis Combat System via ship's radar; terminal flight control is autonomous via the missile's active seeker or supported by the Aegis Combat System via the ship's illuminator.
- SM-6 is being upgraded to the BLK IA configuration to address hardware and software improvements and to address advanced threats.
- SM-6 Dual I capability is being added to provide SBT capability against short-range ballistic missiles.

Mission

- The Joint Force Commander/Strike Group Commander will use SM-6 for air defense against fixed-/rotary-winged targets and anti-ship missiles operating at altitudes ranging from very high to sea skimming.
- The Joint Force Commander will use SM-6 as part of the NIFC-CA FTS operational concept to provide extended range over-the-horizon capability against at-sea and overland threats.

Major Contractor

Raytheon Missile Systems – Tucson, Arizona

FY15 NAVY PROGRAMS

Activity

- The Navy conducted seven SM-6 BLK I missile tests and one SM-6 BLK IA missile test during FY15. Of the planned launches, two of three successfully supported FOT&E with Aegis Baseline 9; one test resulted in a missile failure-to-launch (dud/misfire); one successfully supported NIFC-CA FTS Increment 1 capability; and three SM-6 Dual I missiles successfully supported MDA SBT and Air Warfare retention capability. The single SM-6 BLK IA was successful.

SM-6 BLK I FOT&E

- In March 2015, at Point Mugu, California:
 - An SM-6 BLK I FOT&E mission (D1I) successfully engaged a target that was using electronic attack against the SM-6 missile.
 - An SM-6 BLK I FOT&E mission (D1H) successfully engaged a target that was using electronic attack against the Aegis shipboard radar supporting the SM-6.
 - An SM-6 BLK I FOT&E mission (D1G) failed due to a failure-to-launch (dud/misfire).

NIFC-CA FTS Increment I

- In June 2015, a SM-6 BLK I, in support of NIFC-CA FTS testing, successfully engaged a full-scale fighter target at White Sands Missile Range, New Mexico.

SM-6 BLK IA

- In November 2014, the Navy successfully conducted a land based test launch of the pre-production SM-6 BLK IA at White Sands Missile Range, New Mexico. The missile successfully engaged a subsonic cruise missile target overland. This was the second flight test of the SM-6 BLK IA configuration. The Navy plans to conduct a final GTV mission in FY16 using the production configuration SM-6 BLK IA.

SM-6 Dual I

- In July 2015, at the Pacific Missile Range Facility, Kauai, Hawaii, the MDA and Navy successfully conducted:
 - A Multi-Mission Warfare (MMW) mission 1. In this mission, an SM-6 missile successfully engaged a short-range ballistic missile target.
 - An SM-6 Dual I Air Warfare capability retention MMW mission 3. In this mission, an SM-6 missile successfully engaged a supersonic high-diver target.
 - An SM-6 Dual I Air Warfare capability retention MMW mission 4. In this mission, an SM-6 missile successfully engaged a subsonic low-altitude cruise missile target.
- The Navy conducted these tests in accordance with the DOT&E-approved MDA Integrated Master Test Plan.

Assessment

- During FY15 flight tests, there were no occurrences of the uplink/downlink antenna shroud reliability deficiency. DOT&E and the Navy will continue to collect data on this deficiency throughout FOT&E flight-testing. In addition,

there were no observations of additional anomalies during these tests.

- The March 2015 SM-6 BLK I mission D1G misfire remains under investigation by the Navy with no root cause determination to date.
- In the May 2013 SM-6 IOT&E report, DOT&E assessed SM-6 BLK I as suitable. This assessment considered combined data from the IOT&E and developmental/operational flight tests. During FY15 testing, DOT&E collected additional reliability data and assessed the SM-6 BLK I continues to remain suitable. DOT&E will continue to collect suitability and effectiveness data throughout SM-6 BLK I FOT&E testing in FY16, as well as during all SM-6 flight testing in support of NIFC-CA FTS, MDA, and Aegis software baseline development.
- The performance deficiency discovered during IOT&E and outlined in the classified IOT&E report remains unresolved and continues to affect DOT&E's final assessment of effectiveness. The Navy is assessing several options for a solution, each with varying degrees of complexity. A primary concern is to ensure the solution causes no degradation to the existing SM-6 performance envelope. The corrective actions will be incorporated into production of the SM-6 BLK I and BLK IA configurations and tested during FOT&E.
- In FY16, the Navy expects to demonstrate the maximum range KPP during SM-6 FOT&E and Aegis Baseline 9 operational testing as well as the launch availability KPP.
- Upon completion of the current phase of SM-6 FOT&E, the Navy will have conducted sufficient testing to allow an assessment of the SM-6 Capability Production Document performance requirement for interoperability.
- NIFC-CA FTS Increment 1 test events conducted during FY15 continue to be basic developmental tests not conducted in an operationally realistic manner. The Navy plans to continue testing the Increment 1 configuration with increasingly challenging scenarios; however, no operational test concept or test plans for NIFC-CA FTS increments have been provided to DOT&E.

Recommendations

- Status of Previous Recommendations. The Navy is addressing the previous recommendations from FY14 to complete corrective actions of the classified performance deficiency discovered during IOT&E and develop a flight test program to test those corrective actions; however, no final solution has been determined.
- FY15 Recommendation.
 1. The Navy should provide DOT&E with an operational test concept and operational test plan for NIFC-CA FTS Increment 2.