Tactical Tomahawk Missile and Weapon System

Executive Summary

- The FOT&E Operational Test Launch program concluded in 2013. That phase of operational testing ran from 2004 to 2013. Upon completion of the Operational Test Launch program, DOT&E removed the Tomahawk Weapon System (TWS) from operational testing oversight. This decision was based upon TWS' history of consistent satisfactory performance over the past 9 years in test planning, test execution, and meeting reliability and performance requirements.
- Flight testing to evaluate All-Up Round changes, emerging deficiencies requiring immediate correction, and hardware obsolescence continued under a program monitored by the Navy's Commander, Operational Test and Evaluation Force.
- In 2016, Tactical Tomahawk Weapon Control System (TTWCS) operational test event OT-D-8 included cybersecurity events, a reliability/maintainability maintenance demonstration, non-firing strike group scenario, and modeling and simulation flight test events. OT-D-8 is planned to conclude in FY17 with a live fire flight test. As the program was not under T&E oversight, DOT&E did not oversee these test events or approve the test plan.
- In 2016, the Navy started development of an acquisition strategy for a series of incremental upgrades that modify the Block IV Tactical Tomahawk (TACTOM) into a Maritime Strike Tomahawk (MST) to develop an anti-ship capability. Consistent with mission changes brought about by plans to develop an anti-ship capability, the TWS was placed back on DOT&E oversight. The Navy intends to field MST as a Rapid Deployment Capability (RDC) with a Quick Reaction Assessment (QRA) test strategy. DOT&E assessed that the QRA would not support an adequate operational test but the Navy continues to not plan for any additional operational testing.
- To collect sufficient data for an adequate assessment of the capability, DOT&E identified the need for 36 test flights (based on the existing validated requirements for the Offensive Anti-Surface Warfare (OASuW) program since there were no identified requirements for MST), which could be accommodated by a combination of developmental and operational tests. This test scope could be reduced if the program undertakes an effort to develop a tactical software-in-the-loop modeling and simulation test bed similar to the current Tomahawk modeling and simulation test bed for the land attack mission area.
- The Navy has yet to provide any plans required to assess the functionality and lethality of the warhead against the new MST target set.

System

- The Tomahawk Land Attack Missile is a long-range, land attack cruise missile designed for launch from submarines and surface ships. Beginning in 2017, the Navy plans to develop the MST anti-ship capability as part of the Block IV modernization program.
- There are three fielded variants: a Block III with a conventional unitary warhead, a Block III with a conventional submunitions warhead, and a Block IV with a conventional unitary warhead. Production of Tomahawk Block II and III missiles is complete. Block IV Tomahawk is in production as the follow-on to the Block III conventional unitary warhead variant. These missiles are produced at lower cost and provide added capability, including the ability to communicate and be redirected to an alternate target during flight.
- The Tomahawk Weapon System (TWS) also includes the Tomahawk Theater Mission Planning Center (TMPC) and the shipboard TTWCS. The TMPC and TTWCS provide for command and control, targeting, mission planning, distribution of Tomahawk tactical and strike data, and post-launch control of Block IV missiles.

Mission

The Joint Force Commander employs naval units equipped with the TWS for long-range, precision strikes against land targets. Planned upgrades will allow the Joint Force Command to employ the TWS in anti-ship missions.

Major Contractors

- Missile element: Raytheon Missile Systems – Tucson, Arizona

- Weapon Control System element: Lockheed Martin – Valley Forge, Pennsylvania
- Mission Planning Element:
  - Vencore, Inc. – San Jose, California (Mission Distribution System)
  - Tapestry Solutions – St. Louis, Missouri (Tomahawk Planning System)
  - BAE Systems – San Diego, California (Targeting Navigation Toolset)

Activity

- In 2013, DOT&E removed the TWS from operational testing oversight. This decision was based upon TWS's history of consistent satisfactory performance over the past 9 years in test planning, test execution, and in meeting reliability and performance requirements. Flight testing to evaluate All-Up Round changes, emerging deficiencies requiring immediate correction, and hardware obsolescence continued under a program monitored by the Navy's Commander, Operational Test and Evaluation Force.
- In 2016, based on direction by the Deputy Secretary of Defense, the Navy started development of an acquisition strategy for a series of incremental upgrades that modify the Block IV TACTOM into an MST. The Navy plans to insert this capability in a subset of the TACTOM population (Block IV) as these missiles are inducted into the recertification line.
- In 2016, operational test event OT-D-8, that commenced while the program was not under DOT&E oversight, continued. Testing included cybersecurity events, a reliability/maintainability maintenance demonstration, non-firing strike group scenarios, and modeling and simulation flight test events. OT-D-8 is planned to conclude in FY17 with a live fire flight test. As the program was not under T&E oversight, DOT&E did not oversee these test events or approve the test plan.

Assessment

- The Navy plans to insert the MST capability into the Block IV TACTOM missiles as they go through their modernization process (potentially up to 4,000 rounds), which is a de-facto full fielding of the new mission enhancement. Currently, the Navy does not intend to develop an MST Capability Development Document/Capability Production Document or any other type of requirements document to guide the developmental or operational test planning. Rather, the Navy will issue a "Capability Memorandum." The form and utility of this document for acquisition and test planning purposes remains undetermined.
- The Navy intends to field MST as an RDC supported by a QRA test. Despite being advised by DOT&E that the QRA would not be an adequate operational and live fire test, the Navy continues to not plan for any additional operational and live fire tests. Traditionally, RDCs conduct QRAs in order to support a decision to expeditiously field an initial capability but then plan a full operational test program to support their full-fielding decision. Plans to conduct operational or live fire testing to support the capability deployment are unclear because there are no scheduled Milestones for the TACTOM program.
- DOT&E provided the Navy with an initial operational test design based on the existing validated requirements for the OASuW program as there were no identified requirements for MST. While the OASuW material solution is different (Long Range Anti-Ship Missile (AGM-158C LRASM)), the basic mission was assumed to be similar enough to develop a test design. To collect sufficient data for an adequate assessment of the capability, the test design identified the need for 36 test flights between developmental and operational testing. This number could be reduced if the program undertakes an effort to develop a tactical software-in-the-loop modeling and simulation test bed similar to the current Tomahawk modeling and simulation test bed for the land attack mission area. Because of the very different environments and target characteristics, the current modeling and simulation test bed, optimized for the land attack mission, is not adequate for the maritime strike mission.
- The Navy has yet to provide any plans needed to rigorously assess the functionality and lethality of the warhead against the new MST target set.

Recommendations

- Status of Previous Recommendations. The Navy has addressed all previous recommendations.
- FY16 Recommendations. The Navy should:
  1. Develop and validate operational requirements for the MST mission.
  2. Plan to conduct, and budget appropriately for, full operational and live fire testing of the MST capability. This should include development of a tactical software-in-the-loop modeling and simulation test bed, and functionality and lethality testing of the warhead for the new target set.