

Tomahawk Missile and Weapon System

Executive Summary

- The upgraded Tomahawk Weapon System is effective for operation with both Baseline III and Baseline IV tactics and procedures, including post-launch command and control of Baseline IV missiles.
- The Navy successfully demonstrated the ability to launch Baseline IV Tomahawk missiles from submarine torpedo tubes.
- Based on FY07 test flights, the Navy appears to have successfully addressed the quality control problems that led to FY06 test flight failures.
- The Navy continues to conduct Operational Test Launches to verify reliability and performance of fielded Baseline II, III, and IV Tomahawk missiles; their associated weapon control systems; and the Tomahawk Command and Control System (TC2S). DOT&E considers the planned Operational Test Launch program to be adequate for continued verification of system reliability and accuracy.

System

- Tomahawk Land Attack Missile is a long-range, land attack cruise missile designed for launch from submarines and surface ships. Submarine launch can be accomplished from either standard submarine torpedo tubes or separate vertical launch tubes.
- Tomahawk Baselines II and III completed production. There are currently three fielded variants, delivering a nuclear warhead (Baseline II only, not deployed), a conventional warhead, or a conventional warhead with submunitions.



- Tactical Tomahawk (Baseline IV) is currently in production as the follow-on to the Baseline III conventional warhead variant. These missiles are produced at lower cost and provide added capability, including the ability to communicate with and retarget the missile during flight. Although Baseline III weapons can be launched from submarine torpedo tubes, the initial Baseline IV delivery did not include this capability.
- The TC2S provides for targeting, mission planning, and distribution of Tomahawk tactical data.

Mission

The Maritime Force Commander can employ the Tomahawk missile for long-range, precision strikes against land targets.

Activity

- The Navy continues to conduct Operational Test Launches to verify reliability and performance of fielded Baseline II, III, and IV Tomahawk missiles; their associated weapon control systems; and the TC2S. The Navy conducted a total of 12 Tomahawk missile test launches during FY07, including four test launches from an *Ohio* class Guided Missile Submarine (SSGN) in May 2007. The SSGN crew launched two of these missiles in rapid succession to demonstrate SSGN salvo launch capability.
- The Navy successfully launched a Baseline IV missile from a submarine torpedo tube in March 2007 and completed a second successful launch from a United Kingdom submarine in June 2007.
- The Navy completed the current phase (OT-IIID) of Follow-on Operational Test and Evaluation (FOT&E) for Baseline IV Tomahawk missiles, their associated weapon control systems, and the TC2S. OT-IIID included demonstration of torpedo tube launch capability for Baseline IV missiles, a comprehensive operational test of Baseline IV Tomahawk mission planning, execution and post-launch control, and verification of corrective action for deficiencies identified during Baseline IV IOT&E. All testing was conducted in accordance with the DOT&E-approved Test and Evaluation Master Plan and test plan.
- Commander, Operational Test and Evaluation Force (COMOPTEVFOR), the Navy's operational test agency, published the Tomahawk OT-IIID test report in August 2007. COMOPTEVFOR concluded that the Baseline IV Tactical Tomahawk Weapon System (TTWS) was effective, but not suitable. They based this suitability determination on poor software reliability of the Mission Distribution System (MDS), a major element of TC2S.
- The Navy corrected the MDS software reliability problem and completed a satisfactory operational retest in October 2007.

NAVY PROGRAMS

Assessment

- The Navy OT-IIID test program was adequate to determine the effectiveness and suitability of the upgraded Tomahawk Weapon System.
- The TTWS is effective and suitable for operation with both Baseline III and Baseline IV tactics and procedures, including post-launch command and control of Baseline IV missiles.
- The Navy successfully demonstrated the ability to launch Baseline IV Tomahawk missiles from submarine torpedo tubes.
- Based on FY07 test flights, the Navy appears to have successfully addressed the quality control problems that led to FY06 test flight failures.
- The Navy plans further upgrades to the TC2S and TTWCS in FY08. DOT&E is working with the Navy to ensure the FOT&E program adequately tests the upgraded system prior to fleet introduction.
- DOT&E considers the current Operational Test Launch program for all Tomahawk missile variants to be adequate

for continued verification of system reliability and accuracy. However, the Navy has not funded Baseline II test launches after FY11 and Baseline III test launches after FY12. The Baseline III missiles are expected to remain in operational use until 2020. DOT&E places high value on the continuing collection of flight data to evaluate end-to-end system performance and reliability for all deployed and deployable Tomahawk missile variants.

Recommendations

- Status of Previous Recommendations. The Navy has adequately addressed the FY06 recommendation.
- FY07 Recommendation.
 1. The Navy should consider extending the Operational Test Launch program for Baseline III Tomahawk missiles to cover the entire period they remain in the fleet inventory.