

# Tomahawk Missile and Tomahawk Command and Control System

## Executive Summary

- The Tactical Tomahawk (Baseline IV) missile and Tomahawk Command and Control System (TC2S) remain operationally effective and suitable if operated with Baseline III tactics and procedures. However, the Navy has not yet demonstrated the improvement in communications bandwidth, operator training, and system documentation required in order for the system to reach its full potential.
- Two test launches in FY06 failed to achieve successful launch of Baseline IV missiles from submarine torpedo tubes. Analysis of these failures revealed production quality control problems that the Navy is addressing with several quality control initiatives.
- The planned post-launch command and control capability for Tomahawk Baseline IV remains high risk due to system complexity and the requirement for reliable communications. The Navy is conducting robust developmental testing to correct these problems prior to operational testing in FY07.
- DOT&E considers the planned Operational Test Launch program for both the Baseline III and Baseline IV missile variants 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 Baseline III completed production. There are currently three fielded variants delivering a nuclear warhead (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 Tomahawk Command and Control System 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 Follow-On Testing and Evaluation (FOT&E) on both Baseline III and Baseline IV Tomahawk missiles, their associated weapon control systems, and the TC2S. A total of seven Tomahawk missile test launches were conducted during FY06.
- DOT&E approved Revision D to the Baseline IV Test and Evaluation Master Plan (TEMP) on March 10, 2006, to cover planned FOT&E through FY09. The revised TEMP provides for testing of Baseline IV torpedo tube launch capability and weapon control system upgrades, verification of corrective action for deficiencies identified during IOT&E, and a

continuing program of Operational Test Launches to confirm weapon reliability and accuracy.

- The Navy successfully demonstrated missile navigation using Small Cell Terrain Contour Matching during a test flight in February 2006 with a Baseline III missile. This capability is applicable to both Baseline III and Baseline IV Tomahawk missiles.
- Two test flights in FY06 failed to achieve successful launch of Baseline IV missiles from submarine torpedo tubes. A missile launched in February 2006 successfully achieved cruise flight, but lost power after approximately 3 minutes

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of flight. A second missile, launched in May 2006, failed to achieve cruise flight. The Navy plans a test launch in FY07 to demonstrate torpedo tube launch capability following completion of analysis and corrective action for these failures.

- The Navy delayed a comprehensive operational test of Baseline IV Tomahawk mission planning and post-launch control due to software interface problems in the TC2S and the Tactical Tomahawk Weapon Control System. This event, originally scheduled for 2QFY06, is now planned for 2QFY07 following completion of extensive developmental testing.

## Assessment

- The Baseline IV missile and TC2S remain operationally effective and suitable if operated with Baseline III tactics and procedures. However, the system continues to require improvement in communications bandwidth, operator training, and system documentation in order to reach its full potential. The planned post-launch command and control capability for Baseline IV remains high risk due to system complexity and the requirement for reliable communications. The Navy is conducting robust developmental testing to correct these problems prior to operational testing in FY07.

- Efforts to field a submarine torpedo tube launch capability for Baseline IV have been unsuccessful. Initial analysis of the two failed test launches in FY06 revealed production quality control deficiencies. The Navy is addressing this issue through several quality control initiatives.
- DOT&E considers the planned Operational Test Launch program for both the Baseline III and Baseline IV Tomahawk variants to be adequate for continued verification of system reliability and accuracy. Successful execution of this program depends on continued funding and availability of fleet ships and submarines.

## Recommendations

- Status of Previous Recommendations. This system was not covered in the FY05 Annual Report.
- FY06 Recommendation.
  1. The Navy should continue to adequately fund the Tomahawk Operational Test Launch program and place high priority on providing fleet ships and submarines to support program execution. This is particularly important in light of the quality control concerns identified as a result of the failed Baseline IV torpedo tube test launches.