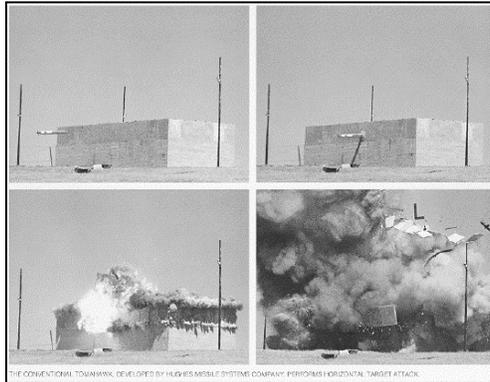


TOMAHAWK



Tomahawk is a long-range cruise missile designed to be launched from submarines and surface ships against land targets. Three primary variants are currently operational: (1) Tomahawk Land Attack Nuclear (TLAM-N) (not deployed); (2) Tomahawk Land Attack Missile-conventional (TLAM-C); and (3) Tomahawk Land Attack Missile-conventional submunition (TLAM-D). Each missile is contained within a pressurized canister to form an all-up-round (AUR). The Combat Control System (CCS) on submarines or the Tomahawk Weapon Control System (TWCS) on surface ships performs engagement planning, missile initialization, and launch control functions aboard the launch platform. Targeting, mission planning, and distribution of Tomahawk tactical data are supported by the Tomahawk Command and Control System (TC2S).

The Tactical Tomahawk program began in FY98 as a restructure of the earlier (FY94-98) Tomahawk Baseline Improvement Program. Tactical Tomahawk represents a considerable leap forward in technology compared with Block III Tomahawk. Designated C³ nodes will be able to communicate with the missile in-flight and direct it to pre-planned alternate targets or change its mission plan to attack new targets. While in-flight, the missile will be able to transmit its health, status, and limited imagery to the C³ nodes.

BACKGROUND INFORMATION

Early in FY01, the AUR program office (PMA-280) announced a six-month delay in the Tactical Tomahawk AUR development and production program. This delay led to an extensive restructuring of the Baseline IV T&E program with a revision to the AUR Low Rate Initial Production (LRIP) entrance criteria. Due to this delay, testing of the Tactical Tomahawk Weapon Control System (TTWCS) was expanded to support existing installation schedules of fleet-releasable TTWCS hardware and software.

Differences between Tomahawk Block III and the Tactical Tomahawk Baseline IV in the fuze, significant structural modifications to the Baseline IV missile, and modified terminal engagement parameters potentially affect system lethality and require live fire testing. During FY00-01, the program office carried out substantial modeling and analysis to address live fire concerns. Modeling and simulation efforts failed to fully address two of the three areas of concern. Subsequently, in FY01, a LFT&E strategy was developed and approved that included system-level testing of Tomahawk Baseline IV missiles with live warheads against realistic targets.

TEST & EVALUATION ACTIVITY

There was one completed test event in FY01, OT-IIIIE. This test evaluated TC2S software release TMPC 3.1. Software version TMPC 3.1 introduced the Post-Digital Scene Matching Area Correlator-Global Positioning System (PDGPS) capability. This feature permits the use of the Global Positioning System aiding after the inertial navigation system has received a Digital Scene Matching Area Correlator (DSMAC) update.

Test event OT-IIIF, evaluating TC2S software release TMPC 3.2, was begun in FY01 but has not yet been completed. This software version adds the capability of planning missions with a steeper terminal dive maneuver than previously available. Other enhancements include tools to increase the efficiency and flexibility of the mission planning process.

Test event OT-IIIL, evaluating the Advanced Tomahawk Weapon Control System (ATWCS) version 1.7.1, was also begun in FY01 but has not yet been completed. ATWCS 1.7.1 incorporates expanded functional capability, improvements in management of data communication, improvements to the human-machine interface, and new interfaces to systems external to ATWCS: the Global Command and Control System-Maritime and the Battle Force Tactical Trainer.

No operational test or live fire test activity of Tactical Tomahawk was conducted in FY01.

TEST & EVALUATION ASSESSMENT

The testing conducted during phase OT-IIIIE resulted in findings that TC2S software version TMPC 3.1 is operationally effective and operationally suitable. The software did not meet certain mission-planning timeline requirements, but the user community found the software acceptable despite this shortcoming. Further investigation by DOT&E revealed that the ORD requirements, as written, do not accurately reflect the operational environment and that correction of this discrepancy would remove the apparent deficiencies. DOT&E asked that the Navy take action to address the discrepancy and ensure that interpretations of the requirements are formally documented.

The restructuring of the Tactical Tomahawk T&E program has reduced both the quantity and quality of the information available to the milestone decision authority for the LRIP decisions. Operational testing to support these decisions has been abbreviated. A single engineering test flight replaces an Operational Assessment (OA) in support of the first LRIP increment. The second LRIP increment will be supported by a second engineering test flight, launched from a fixed underwater site plus stand-alone (non-integrated) testing of the TTWCS vice the completed TECHEVAL. The TECHEVAL entails integrated testing of the AUR, TTWCS, and TC2S operating as a system and is supported by four Tactical Tomahawk AUR flight tests launched from surface ships and submarines. A major purpose of TECHEVAL is demonstrating system readiness for OPEVAL (full-scale OT&E in support of full-rate production), whereas an OA provides early feedback of operational considerations to the program. Consequently, the levels of system maturity and system integration seen in an OA are considerably lower than those of TECHEVAL.

The Tactical Tomahawk T&E strategy presents considerable challenges. Successful development of Tactical Tomahawk will add considerable capability and flexibility to the Navy's land attack arsenal. These new capabilities require an unprecedented degree of integration among the segments. The T&E strategy must ensure that the level of integration achieved in testing is representative of the operational environment.