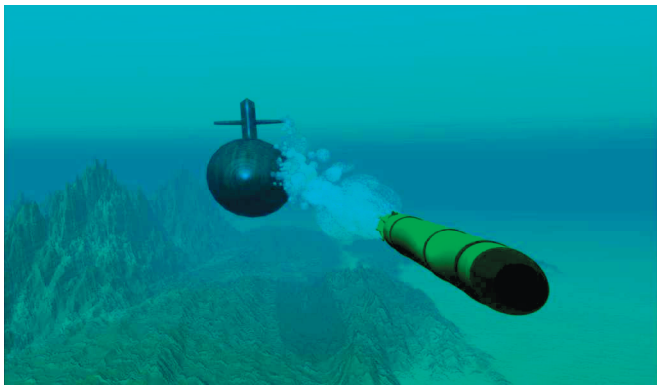
Mk 48 Advanced Capability (ADCAP) Torpedo Mods

Executive Summary
- The Advanced Common Torpedo Guidance and Control Box (ACOT-GCB) operational test is expected to complete by the end of 2005.
- The Common Broadband Advanced Sonar System (CBASS) operational test will extend into 2006.
- The use of Fleet exercises as test venues can be unreliable, resulting in program delays.
- Warshot reliability remains a concern.

System

The Mk 48 Advanced Capability (ADCAP) torpedo is the primary anti-submarine and anti-surface ship weapon for the submarine force.
- Mk 48 ADCAP torpedo mods are a series of hardware and software upgrades to the Mk 48 torpedo.
- Mk 48 ADCAP Mod 4, Mod 5, and Mod 6 are fielded as torpedoes.
- Mk 48 ACOT-GCB replaces obsolete Mod 6 hardware and rewrites the software allowing for an open architecture torpedo design.
- Mk 48 ACOT-GCB is designed to have the same performance as the MK 48 Mod 6.
- Mk 48 CBASS upgrades the Mk 48 ACOT-GCB with new sonar to improve torpedo effectiveness. Mk 48 CBASS is a co-development program with the Australian Navy.



- Future software upgrades called Advanced Processor Builds (APB) are planned to improve torpedo performance.

Mission

The Submarine Force employs the Mk 48 ADCAP torpedo as a long range, heavy weight weapon:
- For destroying surface ships or submarines
- In both deep-water open-ocean and shallow-water littoral environments

Activity
- DOT&E approved the Mk 48 ADCAP ACOT-GCB Test and Evaluation Master Plan (TEMP) Revision 9 on November 8, 2004. The TEMP calls for operational testing in both deep and shallow water and in the Weapons Analysis Facility (WAF) at the Naval Undersea Warfare Center in Newport, Rhode Island.
- The Navy commenced the Operational Evaluation (OPEVAL) of the Mk 48 ADCAP ACOT-GCB torpedo in January 2005 in accordance with a DOT&E-approved test plan.
- ACOT-GCB completed side-by-side comparison testing with the Fleet baseline Mk 48 ADCAP Mod 6 torpedo using the accredited WAF simulation. At sea, end-to-end testing identified a critical hardware design flaw (electrical fault) which shorted the torpedo's program memory module. Land-based and proofing tests failed to identify the flaw which dudded the torpedo. The Navy delayed further in-water testing due to weapon production problems arising from the decertification of the torpedo maintenance facility and problems with test submarine availability. The Navy resumed at-sea testing in September 2005.
- DOT&E approved the Mk 48 ADCAP CBASS TEMP on September 30, 2004. The TEMP calls for both in-water and WAF testing.
- The Navy conducted developmental testing of the Mk 48 ADCAP CBASS torpedo with the Australian Navy in September 2005. Due to delays in WAF simulation development for the CBASS testing, the Navy cancelled plans to use the WAF for comparison testing. This may require a revision to the planned test program and TEMP.
- Navy fleet submarines conducted three Mk 48 ADCAP Mod 6 warshot test firings during 2005.

Assessment
- ACOT-GCB WAF side-by-side comparison tests with Mk 48 Mod 6 appears to be adequate when validated by in-water testing. In-water firings were essential for adequate torpedo testing and evaluation especially for resolving suitability. The electrical fault found during ACOT in-water tests has been corrected and verified in initial testing. The Navy planned further ACOT-GCB testing in conjunction with the Submarine

Command Course training in November 2005 and should complete ACOT operational testing by the end of 2005.

- CBASS testing with the Australian Navy will be conducted as combined developmental and operational testing beginning in December 2005. Due to CBASS development delays, the Navy added a new dedicated operational test exercise in early 2006. Without the WAF, the planned in-water test program may not be adequate to address all performance issues. The WAF allows comparisons to baseline performance. These comparisons will be difficult to conduct with a limited number of planned in-water torpedo shots.
- In response to two Mk 48 Mod 6 failures during a 2003 Ship Sink Exercise, the Navy convened a flag level Reliability Action Panel designed to focus on torpedo production, maintenance, and reliability issues. One of the recommendations included increasing warshot test firings. Three torpedoes were successfully fired in 2005. This program needs to continue to verify the inventory of torpedoes.

Recommendations

1. Testing of torpedoes is often delayed while test assets are identified. Given the concerns over weapon reliability, the Navy should work to arrange more dedicated operational test and Ship-Sink-Exercise opportunities.
2. The WAF simulation must be upgraded to support realistic shallow water modeling for future CBASS development and assessment.