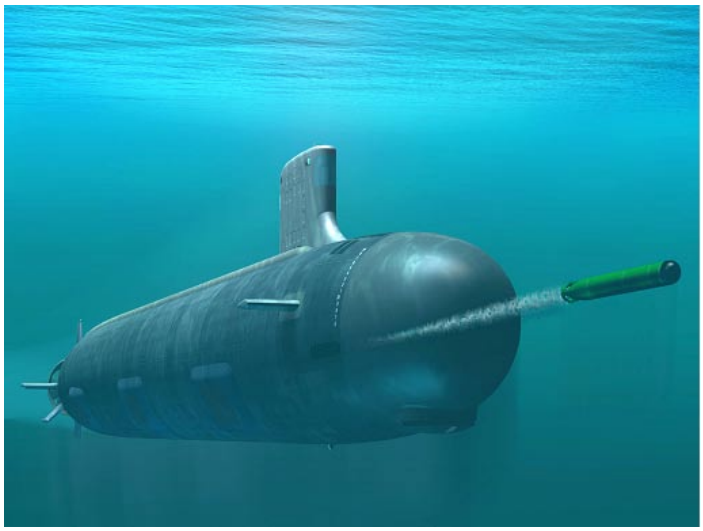
Mk 48 Advanced Capability (ADCAP) Torpedo Modifications (Mods)

Executive Summary
- The Navy completed operational testing of the Mk 48 Advanced Capability (ADCAP) Mod 6 Spiral 1 weapon in October 2008. The testing was adequate and revealed that the upgraded torpedo remains not operationally effective but is operationally suitable.
- The Navy started initial engineering testing of the Mk 48 Mod 7 Common Broadband Advanced Sonar System (CBASS) torpedo Phase II in FY09. The Program Office plans to conduct OT&E in FY11.

System
- The Mk 48 ADCAP torpedo is the primary anti-submarine warfare and anti-surface ship warfare weapon used by U.S. submarines. Mk 48 ADCAP torpedo modifications are a series of hardware and software upgrades to the weapon.
- Mk 48 Mod 5, Mod 6, Mod 6 Spiral 1, Mod 6 Advanced Common Torpedo – Guidance and Control Box (ACOT), and Mod 7 CBASS Phase I are fielded torpedoes.
- The Mk 48 Mod 6 ACOT replaces obsolete Mod 6 hardware and rewrites the software, permitting an open architecture torpedo design to allow future software upgrades. The Navy designed the Mk 48 Mod 6 ACOT to have the same performance as the Mk 48 Mod 6.
- The Mk 48 Mod 6 Spiral 1 torpedo is the last planned software upgrade to the Mk 48 Mod 6. This upgrade uses software algorithms from the CBASS and is intended to improve shallow-water performance.
- Mk 48 Mod 7 CBASS upgrades the Mk 48 ACOT with a new sonar designed to improve torpedo effectiveness through future software upgrades, identified by phase and spiral numbers. Phase 1 torpedoes deliver the initial hardware and software; Phase 2 torpedoes are required to deliver full capability. The Navy fielded CBASS Phase 1; Phase 2 is in development.
- CBASS is a co-development program with the Royal Australian Navy.



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

Prime Contractor
- Raytheon Integrated Defense Systems, Tewksbury, Massachusetts

Activity
- The Navy completed shallow-water operational testing and deep-water regression testing of the Mk 48 Mod 6 Spiral 1 torpedo, in accordance with a DOT&E-approved test plan, in October 2008.
- The Navy's Independent Test Authority, Commander, Operational Test and Evaluation Force (COTF), issued an Operational Test Report on the Mk 48 Mod 6 Spiral 1 torpedo in April 2009.
- The Navy completed development of an initial Test and Evaluation Master Plan (TEMP) to cover the Mk 48 Mod 7 CBASS Phase 2 torpedo. DOT&E approved the TEMP on November 5, 2009.
- The Navy started testing of CBASS Phase 2 software in parallel with TEMP approval. The program began initial engineering testing in FY09 and completed 36 in-water shots by the end of the fiscal year, with plans to shoot 40 others by the end of 1QFY10. An additional 60 developmental test shots are planned for later in FY10. The Program Office plans to conduct OT&E in FY11.

- The Navy conducted two successful Mk 48 Mod 6 Service Weapons Test events in FY09 using weapons selected from the warshot inventory. These test events confirm in-service torpedoes will still detonate after long term storage.

Assessment

- The Navy conducted adequate operational testing of the Mk 48 Mod 6 Spiral 1 torpedo.
- The Navy incorporated CBASS software algorithms into the Spiral 1 torpedo to improve shallow-water performance, but testing demonstrated the performance was still below thresholds.
- Both COTF and DOT&E evaluate the Mk 48 Mod 6 Spiral 1 torpedo as not operationally effective but as operationally suitable.
- Regression testing of the Mk 48 Mod 6 Spiral 1 confirmed that other areas of weapons performance were not degraded.
- For additional information on overall Mk 48 performance, see DOT&E's Mk 48 CBASS OT&E report dated January 2008.

Recommendations

- Status of Previous Recommendations. The Navy has made progress in addressing four of the six previous recommendations.
- FY09 Recommendation.
  1. The Navy should conduct a review of torpedo performance and current processes to improve performance in shallow water and countered environments.