

Seawolf SSN 21 Class Attack Submarine and AN/BSY-2 Combat System

The *Seawolf* (SSN 21) Nuclear Attack Submarine is designed to rapidly deploy to hostile ocean areas and deny use to the enemy, clear the way for strikes by other friendly forces, and engage and destroy enemy submarines, surface forces, and land targets. Secondary missions are mine and special warfare. *Seawolf* is designed to be a quiet, fast, heavily armed and survivable submarine.

The AN/BSY-2 Submarine Combat System is designed to support SSN 21 in all mission areas. It detects, classifies, localizes and tracks targets, platforms, and weapons by means of onboard active and passive sensors and with augmented target information from other platforms and external detection systems. The combat control subsystem provides setting and control of weapons, over-the-horizon targeting, combat systems management, improved target motion analysis, piloting and navigation functions, and automatic contact correlation. It includes the weapon launch equipment for the Mark 48 Advanced Capability Torpedo and the Tomahawk Missile. Acoustic hardware includes a truncated 24 ft diameter spherical receive array, a 15 ft diameter hemisphere active transmit array, a wide aperture array, a low frequency bow array, two towed arrays, and a mine detection and avoidance high frequency array.

The *USS Seawolf* began initial sea trials in July 1996 and completed acoustic trials in November 1997. The *USS Connecticut* (SSN 22) went to sea in 1998. The third and final *Seawolf* class submarine, *Jimmy Carter* (SSN 23), is under construction with delivery scheduled in FY04. *USS Jimmy Carter* will be uniquely outfitted with an additional hull section lengthening the ship for special missions and research and development projects.

The *USS Seawolf* LFT&E plan included a 1/4 scale Shock Model Test Vehicle that underwent underwater shock and hull whipping. The Navy conducted extensive shock qualification testing of vital *USS Seawolf* internal components using Floating Shock Platforms (test barges) and standard Navy shock test machines. The original LFT&E Plan for *Seawolf* featured a full-ship shock trial of the completed ship. However, Congressional legislation that prohibited the Navy from funding *Seawolf's* shock trials prevented a full ship shock trial.

The *Seawolf* OPEVAL was completed in FY01. Warm water and cold water testing was performed by *USS Seawolf*. Minefield testing was conducted by *USS Connecticut*, which then deployed for five weeks to the Arctic and surfaced at the North Pole in June 2001. In September 2001, it completed a test of the missile strike capability while performing as a launch platform for a Cruise Missile Program Operational Test Launch.

The Office of the Director, Naval Nuclear Propulsion has cradle to grave responsibility and reporting for all aspects of nuclear propulsion plants. DOT&E has been briefed on the Naval Nuclear Propulsion processes for design and qualification of nuclear propulsion plants that power certain classes of U.S. Navy ships and was impressed with the thoroughness and complete understanding of the rationale behind operational requirements and specification. All other DoD programs would benefit from implementing similar processes to ensure the rationale behind the operational requirements and specifications is understood.



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NAVY PROGRAMS

TEST & EVALUATION ACTIVITY

Test and evaluation activity in 2003 consisted of a short trip to the Arctic by *USS Connecticut* to confirm retest fixes for deficiencies and to conduct developmental testing of under-ice software for Mark 48 torpedoes.

DOT&E issued a classified combined OT&E/LFT&E Report on the *USS Seawolf* and the BSY-2 Submarine Combat Control System on July 15, 2003.

TEST & EVALUATION ASSESSMENT

Although several requirement thresholds were not met, DOT&E evaluated the *Seawolf* Class Nuclear Attack Submarine and the BSY-2 Submarine Combat Control System as operationally effective and operationally suitable. Details of *USS Seawolf's* performance during OPEVAL are available in the classified OT&E/LFT&E Report. The *Seawolf* and the BSY-2 Combat Control System were adequately tested to assess operational effectiveness and suitability, but the lack of a full ship shock trial prevented full assessment of *Seawolf's* survivability. However, the *Seawolf* design incorporates numerous features that improve survivability over previous classes. These features make *Seawolf* less susceptible and vulnerable and thus, considered more survivable than the *Los Angeles* class submarine.