

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

The *Seawolf* (SSN 21) Nuclear Attack Submarine is intended to rapidly deploy to hostile ocean areas and deny their 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 intended to be a quiet, fast, heavily armed, and survivable submarine.

Seawolf began initial sea trials in July 1996. Following delivery, *Seawolf* completed acoustic trials in November 1997. *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 FY05. *Jimmy Carter* will be uniquely outfitted with an additional hull section lengthening the ship for special missions and Research and Development projects.

TEST & EVALUATION ACTIVITY

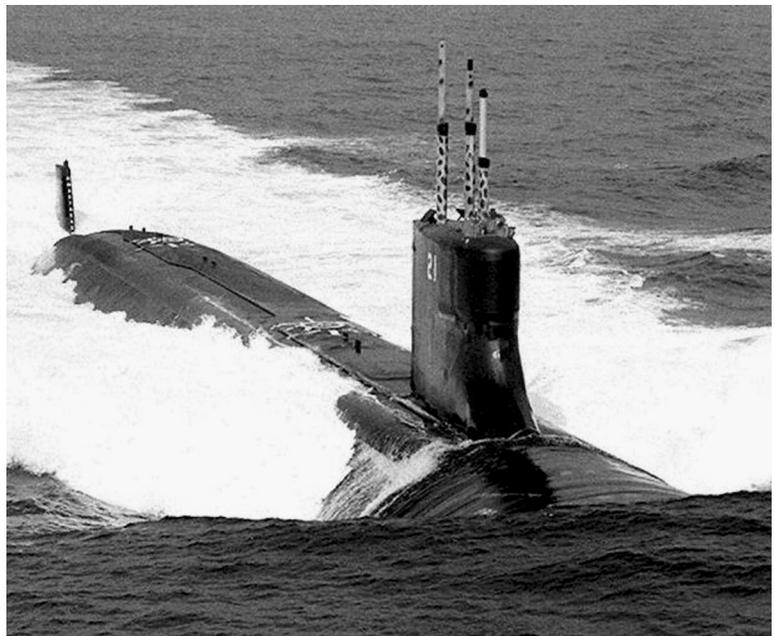
In accordance with the *Seawolf* Live Fire test and Evaluation plan (LFT&E), underwater shock tests of major components, hull whipping analyses, and shock qualification testing of vital internal components have occurred since 1995.

The approved LFT&E Plan for *Seawolf* featured a full ship shock test (FSST) of the completed ship. The FSST was not accomplished initially because funding for it was used to correct design deficiencies discovered in testing. Subsequent legislative action prohibited the Navy from sending money to support the FSST.

The Navy prepared a *Seawolf* Class Vulnerability Assessment Report (VAR) in accordance with the approved LFT&E strategy. The VAR, completed in January 2001, provides an overall assessment of vulnerability to threat weapons that may be encountered in combat. Although the VAR is a highly detailed analytical assessment of ship vulnerability, the lack of an FSST to validate it will yield only a partial survivability picture of the ship class.

The Navy based its VAR on component and subsystem tests, surrogate tests, and analyses. The fact that the FSST did not occur prevents the Navy from fully addressing all the agreed upon LFT&E issues and gaining a better understanding of ship survivability characteristics, leaving the overall *Seawolf* LFT&E program incomplete.

The *Seawolf* Operational Evaluation (OPEVAL) was completed in December 2001. Warm water and cold water testing was performed by *USS Seawolf*. Minefield testing was conducted by *USS Connecticut*. *Connecticut* then deployed for five weeks to the Arctic and surfaced at the North Pole in June 2001. In September 2001, *Connecticut* completed a test of the missile strike capability while performing as launch platform for a Cruise Missile Program Operational Test Launch. Commander, Operational Test Force has written its final OPEVAL report. DOT&E is in the process of completing its own evaluation of *Seawolf* operational effectiveness and suitability.



Seawolf Submarine Underway

NAVY PROGRAMS

TEST & EVALUATION ASSESSMENT

The *Seawolf* submarine is operationally effective and operationally suitable.

The *Seawolf* OPEVAL demonstrated that many capabilities of this class of submarine are superior compared to the Improved *Los Angeles* Class (688I).

The improved quietness of the *Seawolf* directly translated to superior tactical effectiveness. *Seawolf* repeatedly proved capable of covertly and accurately targeting and tracking its adversary. The management of *Seawolf's* noise transients was superior to that of the *Los Angeles* Class. The noise from weapons launches was also quieter than previous classes.

The ability of the *Seawolf's* BSY-2 Fire Control and Sonar system to satisfactorily place weapons on target was superior to that of the 688/688I class submarines, the baseline system against which it was tested. The *Seawolf* was able to “shoot first” in an overwhelming number of cases, a key test in the effectiveness of a submarine.

This was the first OPEVAL of an entire Submarine and its Weapon system. The methods used in testing for the various segments of the OPEVAL were successful in evaluating this complex weapons system. The *Seawolf* was adequately tested in regard to the threat considering the ships and sensors that were used against it during the OPEVAL.

In the Anti-Submarine Warfare role against nuclear submarines, *Seawolf* was evaluated in Clearance, Intercept, Surveillance and Forward Areas roles in cold water, warm water, and arctic environments. The warm water area was the Atlantic Fleet Weapons Training Facility in Puerto Rico, which was used to conduct littoral testing. The Strike warfare capability was evaluated in two ways. An actual Operational Test Launch of one Tomahawk missile was conducted, followed by an 8-missile spin-up to simulate a large salvo launch.

A classified version of this report discusses *Seawolf's* performance in the Arctic. The classified version also discusses two systems that were found to be unsuitable by Operational Test and Evaluation Force.

Not all operational requirements were met by the *Seawolf*. More details are contained in the classified version of this report.

Many new steps were made in this OPEVAL as compared to previous testing. An extensive use of “free play” scenarios was employed as compared to “canned” scenarios of the past. Extensive submarine recordings were obtained and taken back to laboratories ashore to see how the submarine crew functioned compared to the system’s capabilities. Finally the submarine was tested in many different environments and in an “end to end” manner against realistic opposing forces.

The *Seawolf* Class VAR addresses the LFT&E issues and provides an overall assessment of vulnerability to threat weapons that may be encountered in combat. LFT&E issues addressed include the ship’s vulnerability to underwater explosions, torpedoes and mines, and the ship’s ability to maintain hull integrity and perform its mission after exposure to specified levels of underwater shock intensity. The VAR applies to both SSN 21 and SSN 22, but it does not apply to *Jimmy Carter* (SSN 23) because, with approximately 100 feet in extra length and 2,500 tons added displacement, it is a much different ship. The Navy is developing a VAR Supplement to the *Seawolf* Class VAR to address unique *Jimmy Carter* (SSN 23) considerations.