SSGN-26 *Ohio* Class Conversion

The Navy is reconfiguring four *Ohio* class nuclear ballistic missile submarines (SSBNs) as tactical platforms and retiring them from their strategic role. The *Ohio* class cruise missile submarine (SSGN) program entails the refueling and conversion of the four SSBNs to dedicated cruise missile launch submarines to support the Land-Attack/Strike mission. Each new Multiple All-Up-Round (AUR) Canister (MAC) launchers contain seven Tomahawk land-attack missiles (TLAMs) and fit within the existing Submarine Launched Ballistic Missile (SLBM) vertical launch tubes. Each SSGN will accommodate up to 22 MACs, for a total of 154 TLAMs.

The SSGN will also support Special Operations Forces (SOF) missions. Two of the large vertical launch tubes will be converted to SOF lockout chambers and the ship will feature dedicated accommodations for SOF personnel and their equipment. The SSGN is capable of hosting the Advanced SEAL Delivery System (ASDS) and Dry Deck Shelter on its upper deck.

In the future, the extensive payload capacity of the SSGN may be used to support other offboard systems, including large unmanned and autonomous underwater vehicles, as well as alternate weapons systems.

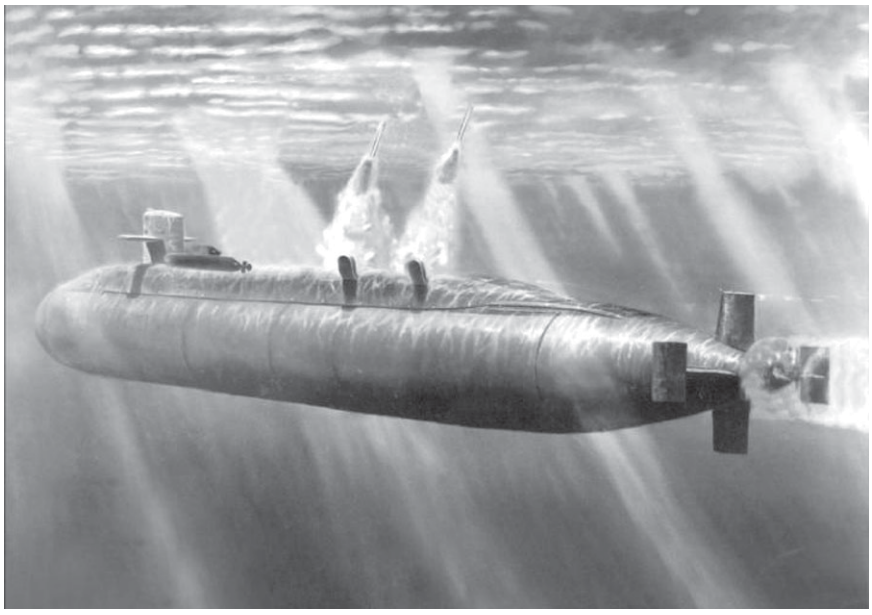
The Navy plans to conduct operational evaluation (OPEVAL) of the SSGN's Strike and SOF missions in FY07.

TEST & EVALUATION ACTIVITY

The Navy approved the SSGN Operational Requirements Document in September 2002. DOT&E approved the Test and Evaluation Master Plan (TEMP) in November 2002; however, the TEMP requires a revision to reflect new developmental test plans.

The Navy conducted Demonstration and Validation (DEMVAL) testing of the MAC design in the Atlantic in January 2003. Two TLAMs were fired from *USS Florida* using a non-production mock-up of the MAC. In addition, land-based tests were performed on MAC subsystems.

Two LFT&E Program Reviews were held during FY03. Emphasis of the reviews were on defining the LFT&E program in detail and the content of the Vulnerability Assessment Reports. Since the Navy's goal is to maintain the level of survivability in the converted SSGN and not introduce any deficiencies into the platform survivability, these meetings addressed how to limit the survivability concerns to the changed areas. DOT&E emphasized this concern in light of the revised operating concepts and scenarios for the SSGN. To initiate efforts on damage scenarios, a Total Ship Survivability Test Management Plan was developed and working groups were established. In May 2003, the SSGN Project Manager signed a Vulnerability Assessment Report. As part of the vulnerability assessment an SSGN component shock database was initiated to demonstrate SSGN's capability to withstand required shock levels.



The SSGN program entails the refueling and conversion of four Ohio *class SSBNs to dedicated cruise missile submarines.*

TEST & EVALUATION ASSESSMENT

During the DEMVAL firings, *USS Florida* successfully launched two TLAMS that reached their targets. The launcher system employed a demonstration article (DEMVAL MAC) which replicated the AUR spacing in a tactical production MAC, featuring two AUR missiles and an Inert Instrumented Test Vehicle (IITV). Due to the use of a Trident C4 diameter missile tube, the DEMVAL MAC could accommodate only three (vice seven) AURs. While two TLAMs were designated as launch articles, the IITV was intended to be a witness round to measure the survivability of adjacent enclosures. The program reported the witness round experienced some damage, and there were indications of post-launch debris and launch pressure transient problems. The program initiated a redesign effort of the AUR Capsule Closure Assembly (CCA) to enhance survivability during launch events.

The Program Office believes land-based testing of the CCA redesign will replicate all aspects of the SSGN environment and provide capability for repeatability testing, lifecycle testing, and testing at environmental extremes. DOT&E believes that additional at-sea TLAM developmental test firings should be scheduled as developmental tests using the production MAC in order to adequately test the launch system prior to starting OPEVAL. The Navy could leverage previously scheduled TLAM test firings by using the SSGN as the launch platform. While the Navy has extensive experience with vertical launch of TLAMs from Improved *Los Angeles* class SSNs and SLBMs from SSBNs, the MAC represents an entirely new launch system. Specifically, the MAC includes up to seven separate AUR TLAM canisters placed within a vertical tube with a single hatch. There are several risks associated with the launch concept, including the effects of launch debris on the ship and associated systems, launch damage to adjacent AURs, and the effects of the SSGN's hydrodynamic flow field on the missiles. DOT&E supports the program's DEMVAL plan as an important technical test and risk mitigation effort, but will require a full end-to-end test of the production-representative system at sea to satisfy operational test requirements. Ideally, a full salvo of TLAMs would be fired, but cost and range safety restrictions limit the launch rate of real cruise missiles. Firing of inert TLAM-surrogates would demonstrate the launch and booster firing without transitioning to flight, but no such test articles exist. The current Strike operational test plans include the launch of five TLAMs from a single MAC, spaced as closely as possible over the course of several days. While the consecutive firings may provide some indication of the cumulative stress on the system, the firing rate will be too slow to replicate a true salvo.

The SSGN program is developing an AUR Simulator that incorporates TLAM electronic simulation, pressure/vent volume and control capability, and power demand. The simulators will be loaded into SSGN MACs to replicate a 32-missile salvo. In addition, a full set of 32 AURs will be loaded and spun up as part of the at-sea testing of the weapons control system.

For both the Strike and SOF mission operational tests, the conduct of realistic operations against a capable opposing force is essential. DOT&E emphasizes that the SSGN missions will involve new concepts of operations and take it into new environments, including the littorals. The SSGN must demonstrate the ability to execute its missions effectively while maintaining survivability. DOT&E is particularly interested in the shallow water, slow speed ship control and the ability of the sonar and combat systems to support the situational awareness to accomplish these new missions.

Progress has been made on the direction and scope of the LFT&E program. However, the Navy allocated limited resources for LFT&E while maintaining an aggressive program schedule. The LFT&E program scope is the minimum acceptable, considering the upgraded weapon system and its new operating environments.