SSN 774 *Virginia* Class Submarine

Executive Summary

- The Navy completed builder's trials, delivered the second ship of the class, and commissioned the ship as USS *Texas* in September 2006. Both the crew and ship performed well.
- The USS *Virginia* started a Post-Shakedown Availability to complete deferred new construction work and to correct trial deficiencies. Schedule delays are already reducing the time planned for completing OT&E scheduled to start in late 2008.
- The operational performance of supporting programs, such as the Acoustic Rapid Commercial Off-the-Shelf Insertion (A-RCI) sonar, towed arrays, and the torpedo has increased the risk of successfully meeting performance thresholds in some mission areas.
- DOT&E approved the Navy's revised LFT&E plan, which deleted the full ship shock trial.

System

The *Virginia* class submarine is the replacement for the aging fleet of *Los Angeles* class submarines. The *Virginia* class:

- Is capable of targeting, controlling, and launching Mk 48 Advanced Capability torpedoes, Tomahawk cruise missiles, and future mines
- Has sonar capability similar to the *Seawolf* submarine class with improvements to the electronic support suite and combat control systems
- Has a new design propulsion plant incorporating proven components from previous submarine classes
- Utilizes a modular design and significant commercial off-the-shelf computer technologies and hardware

Mission

The Maritime Mission Commander will employ the *Virginia* class submarine to enable open-ocean and littoral covert operations in support of the following submarine mission areas:

- Strike warfare
- Anti-submarine warfare
- Intelligence, surveillance, and reconnaissance; indications and warnings; and electronic warfare
- Anti-surface ship warfare
- Special warfare
- Mine warfare
- Battle Group Operations

Activity

- The Navy conducted the first test of the Total Ship Survivability Trial on the USS *Virginia* in January 2006 in Groton, Connecticut.
- The Navy successfully completed builder's sea trials and commissioned the second ship of the class as USS *Texas* in September 2006.
- The lead ship, USS *Virginia*, started a Post-Shakedown Availability (PSA) in January 2006 to complete deferred construction installations and to correct initial trial deficiencies.
- Commander, Operational Test and Evaluation Force completed an Operational Assessment Report of USS *Virginia* on May 26, 2006.
- The Navy completed both actions per the Navy/OSD agreement to delete the full ship shock trial from the approved LFT&E program, namely:
  - Complete the verification, validation, and accreditation of the Transient Shock Analysis Process
  - Conduct a bottoms-up review of the entire *Virginia* class LFT&E program to identify any data voids and additional testing and/or analysis that may be needed to better understand the survivability of the *Virginia* class submarine
- DOT&E approved the revised LFT&E Management Plan in September 2006 as a result of the above actions.

Assessment

- The USS *Texas* completed initial trials with few deficiencies, but was delivered almost a year behind schedule. Other *Virginia* program schedule slips have put pressure on the Milestone and future deployment dates, causing the Navy to seek to postpone some operational testing. DOT&E believes the Navy should complete adequate evaluations of all mission areas and major capabilities as a part of the IOT&E.
- The Navy's operational assessment evaluated *Virginia* Anti-Submarine Warfare search and attack, Special Warfare,

and Battle Group Support mission areas as having high performance risk for operational effectiveness largely due to deficiencies with programs that are not Acquisition Category 1 programs. DOT&E agrees with this assessment. The reports of the A-RCI Sonar and Mk 48 Advanced Capability Torpedo Mods in this Annual Report provide additional details.

- The Navy plans to upgrade many of the spiral development Non-Propulsion Electronics Systems during the 2007 modernization availabilities. The timing and selection of the version for installation in spiral development programs is a balance between adding modernization capability, increased cost, and system stability. The *Virginia* program has chosen system stability. This will result in more modern and capable versions already being introduced to the fleet prior to *Virginia*'s operational test.
- The Navy proposed conducting *Virginia* weapons testing at the Atlantic Underwater Test Evaluation Center range in the Bahamas. The range saves time by allowing multiple weapons to be tracked, located, and recovered at the same time; however, the range represents a very different environment from the noisy, high contact, and littoral areas for which the *Virginia* submarine was designed. DOT&E requires open-ocean weapons testing in littoral environments to adequately evaluate *Virginia* weapon performance.
- DOT&E anticipates a comprehensive survivability evaluation will result from a successful completion of the revised LFT&E program.

Recommendations

- Status of Previous Recommendations. The following FY05 recommendations remain valid:
  FY05 #1: DOT&E recommends that the Navy complete all developmental and operational testing before conducting further deployments.
  FY05 #2: Navy operational tester should ride all ship underway periods to ensure familiarity with *Virginia* systems and to support the rapid completion of operational evaluation.
  FY05 #3: The Navy should consider installing upgraded supporting systems before operational evaluation.
- FY06 Recommendation.
  1. The Navy should invest in a capability and develop procedures to conduct:
     - Realistic shallow-water and littoral testing and training to include a robust open-ocean weapon locating and recovery capability
     - Realistic minefield training and testing