# Columbia-Class Submarine



In FY24, the Navy's Operational Test and Evaluation Force (OPTEVFOR) conducted integrated testing for early assessment of the Strategic Weapon System (SWS), used on the *Columbia*-class to launch TRIDENT II D5 missiles at a shore-based test facility. The *Columbia*-class submarine program also continued cyber security evaluations of submarine sonar, combat, and Hull Mechanical and Electrical systems as part of a strategy to maximize resilience of the delivered *Columbia*-class to cyber-attack. The Navy plans to conduct an operational assessment of the *Columbia*-class design and its systems between FY25 and FY26.

# SYSTEM DESCRIPTION

The *Columbia*-class replaces the *Ohio*-class fleet ballistic missile submarine (SSBN). *Columbia*-class design is intended to:

- Improve survivability over the legacy *Ohio*-class.
- Maximize availability and not require mid-life refueling, which will allow a fleet of 12 submarines to maintain the same at-sea presence as a fleet of 14 legacy submarines.
- Host the existing TRIDENT II D5 Life Extension (LE) and second variant LE Strategic Weapon System (SWS). The SWS provides missile launch capability and includes fire control, navigation, and support systems.
- Use existing and recapitalized Ohio-class basing, maintenance, and training infrastructure. The Navy is leveraging many ship components, such as communications, sonar, tactical control system, and internal computer networks, from other submarine classes to reduce cost and risk.
- Support a mixed-gender crew.
- Support a 42-year service life.

#### MISSION

The Commander, U.S. Strategic Command (USSTRATCOM) will employ *Columbia*-class submarines as the survivable leg of the U.S. nuclear triad, providing an effective Sea Based Strategic Deterrence (SBSD) model. SBSD is the foundation of our national defense, providing 70 percent of the nation's deployable nuclear warheads.

### PROGRAM

The Columbia-class submarine program is an Acquisition Category 1D Major Defense Acquisition program. The Navy will procure 12 Columbia-class submarines to support USSTRATCOM requirements. The Navy intends the first delivery, the future USS District of Columbia (SSBN 826), to conduct its first Strategic Patrol in FY30.

DOT&E approved an update to the *Columbia*-class TEMP and an update to the *Columbia*-class LFT&E Management Plan in June 2023. The Navy plans to submit a test plan for an operational assessment of the *Columbia*class design and its systems to DOT&E for approval in FY25 and conduct the assessment between FY25 and FY26.

#### » MAJOR CONTRACTORS

- General Dynamics Electric Boat (GDEB) – Groton, Connecticut
- Newport News Shipbuilding, a division of HII – Newport News, Virginia

# **TEST ADEQUACY**

In FY24, the Columbia-class submarine program continued cyber security evaluation and improvement efforts with the Virginia-class submarine program. The Navy's strategy is to maximize the cyber survivability of the delivered Columbia-class and Block V variant of the Virginiaclass through participation in the continued development of the AN/ BQQ-10 submarine sonar system, Acoustic Rapid Commercial Offthe-Shelf Insertion (A-RCI), and AN/BYG-1 submarine combat systems that get updated about every two years. DOT&E observes these, and other, system-level evaluations to support planning of future Columbia-class cyber survivability evaluations and to identify data that can be used for, and to focus, these assessments.

Between March and September 2024, OPTEVFOR conducted integrated testing of the SWS, which is developmental testing intended to support operational test objectives, at the Strategic Weapon System Ashore (SWSA) facility located at Naval Ordnance Test Unit, Cape Canaveral Space Force Station, Florida. Testing was in accordance with the DOT&E-approved data collection plan and included DOT&E observation. The program and OPTEVFOR exercised offload/ onload of a surrogate TRIDENT II D5LE missile, demonstration of a tactically representative launch countdown, and demonstration of fleet maintenance actions on

*Columbia*-class tactical hardware installed at the SWSA facility.

In FY24, the Columbia-class LFT&E program focused on analysis and model validation using surrogate and component testing conducted in FY16-22. The program office continued to work with DOT&E on determination of equipment failure thresholds and personnel injury model techniques for incorporation into the analysis of simulated threat weapon attacks. When completed, the survivability assessment of the submarine, using validated modeling and simulation, will enable assessment of the submarine's vulnerability to threat weapons. The Columbiaclass Total Ship Survivability Trial (TSST) is scheduled for FY29 and Survivability Assessment Report (SAR) II will be provided in FY26 and SAR III in FY29.

#### PERFORMANCE

#### » EFFECTIVENESS, SUITABILITY, AND SURVIVABILITY

Insufficient data are available to determine the operational effectiveness, suitability, and survivability of the *Columbia*-class. DOT&E will report on the current platform design and its systems after completion of the operational assessment that the Navy expects to occur in FY26. DOT&E will report on operational effectiveness and suitability after completion of IOT&E, which the Navy expects to occur in FY29. DOT&E expects to report on the survivability of the *Columbia*-class upon completion of TSST in FY29 and completion of the final SAR, SAR III, which the Navy expects to provide in FY29.

# RECOMMENDATIONS

None.