

ARCHIVED REPORT

For data and forecasts on current programs please visit
www.forecastinternational.com or call +1 203.426.0800

Surface Tactical Team Trainer (STTT) / Battle Force Tactical Trainer (BFTT)

Outlook

- Upgrade variant transitions to production
- Installed fleetwide aboard AEGIS-equipped destroyers and cruisers
- R&D for system enhancement continues

Orientation

Description. The Surface Tactical Team Trainer (STTT) program develops Battle Force Tactical Trainer (BFTT)/Cryptologic Systems Embedded Trainer (CSET) systems to provide realistic joint warfare training, including a means of linking ships together for coordinated in-port training. The BFTT (designated USQ-T46) supports the embedded trainer "family of systems" approach in developing a Total Ship Training Capability (TSTC).

Specific tasks include improving integration with the Navy Continuous Training Environment (NCTE) and the development of a High Level Architecture (HLA) integrated shipboard network to meet the fleet synthetic training requirements of the Commander Naval Surface Forces (CNSF) and U.S. Fleet Forces Command (USFFC). The need to transform training is documented within the DoD Training Transformation Plan, the Chief of Naval Operations Fleet Response Plan, and the Commander United States Fleet Forces Command Fleet Readiness Training Plan.

Sponsor

U.S. Navy
Naval Training Systems Center
Orlando, FL
USA
(Program manager)

Status. In operational service, with extensive software development ongoing.

Total Produced. According to L3Harris, more than 700 BFTT systems have been installed in U.S. Navy warships, including CVN, CG, DDG, LHA, LHD, LPD, and LSD class ships, and at shore training facilities nationwide. At least 130 ships have been fitted with the BFTT system.

Platform. Surface warships and training facilities.

Application. Simulation, training, and evaluation.

Price Range. Indeterminate at this time due to the R&D nature of this program.

Surface Tactical Team Trainer (STTT) / Battle Force Tactical Trainer (BFTT)**Contractors****Prime**

CACI - National Security Solutions	https://www.caci.com , 11955 Freedom Dr, Reston, VA 20190 United States, Tel: + 1 (703) 434-4000, Fax: + 1 (703) 434-6000, Packager
Global Technical Systems (GTS)	https://gts.us.com , 784 Lynnhaven Pkwy, Virginia Beach, VA 23452-7315 United States, Tel: + 1 (757) 468-8751, Fax: + 1 (757) 468-8755, Packager
L3Harris - Maritime Systems	https://www.l3harris.com , 750 Miller Dr SE, Leesburg, VA 20175 United States, Tel: + 1 (703) 443-1700, Fax: + 1 (703) 443-2688, Email: info.maritime@L3T.com , Packager, Defunct
Lockheed Martin Rotary and Mission Systems	https://www.lockheedmartin.com , 199 Borton Landing Rd, PO Box 1027, Moorestown, NJ 08057-0927 United States, Tel: + 1 (856) 722-4100, Prime
Northrop Grumman Aerospace Systems	https://www.northropgrumman.com , 1 Space Park, Redondo Beach, CA 90728 United States, Tel: + 1 (310) 812-4321, Second Prime
Textron Systems, Unmanned Systems (AAI)	https://www.textronsystems.com , 124 Industry Ln, PO Box 126, Hunt Valley, MD 21030-0126 United States, Tel: + 1 (410) 666-1400, Email: aaireg@aaicorp.com , Packager

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 75 Glen Road, Suite 302, Sandy Hook, CT 06482, USA; rich.pettibone@forecast1.com

Technical Data

STTT. The STTT program develops BFTT/CSET systems to provide realistic joint warfare training, including a means of linking ships together for coordinated in-port training. The STTT itself comprises the planned shipboard weapons system interface of the Joint Tactical Combat Training System. The JTCTS program develops fleet-deployable instrumentation for at-sea-surface, subsurface, and air training tactics purposes.

USQ-T46 BFTT. The Battle Force Tactical Trainer is a ship Combat Information Center (CIC) trainer that handles all naval combat mission scenarios, including ASW. The BFTT program expands the CIC training concept by developing prototype surface-ship combat system trainers and then integrating them into a shipboard training network. The effort commenced in FY93, with emphasis on developing and demonstrating BFTT preproduction shipboard systems and scenario generation, control, and display enhancements.

BFTT provides realistic joint warfare training across the spectrum of warfare, realistic unit-level team training in all warfare areas, a means of linking ships together that are in different home ports for coordinated training, external simulation of shipboard training systems, and simulation of non-shipboard forces. The BFTT uses a distributed architecture and is compatible with Distributed Interactive Simulation (DIS) protocols. It provides ship and battle force commanders with the ability to conduct coordinated, realistic, high-stress

combat system team training in support of the U.S. Navy's Afloat Training Organization.

Constantly upgraded and modified, the BFTT contains several variants and upgrades including the BFTT Electronic Warfare Trainer (BEWT), Training Communications Sub-System (TCSS), and Trainer Simulator Stimulator System (TSSS).

UQS-T52 ATD. The Advanced Training Domain (ATD) is the next generation of the BFTT which integrates the TI-16 Combat System Technical Insertion 2016 hardware and display. The system has a reduced footprint consisting of just one AN/UQS-T52 rack with unique and modular hardware and software.

JTCTS. The Joint Tactical Combat Training System (formerly the Tactical Combat Training System) became a joint U.S. Navy/Air Force program in March 1994. JTCTS develops Navy fleet-deployable instrumentation for at-sea-surface, subsurface, and air training and tactics purposes, and fixed/transportable air range instrumentation for the Navy and Air Force. It incorporates the DIS Protocol Data Unit for live drills and for virtual (use of simulator) and constructive (wargame) simulations.

CSET. The Cryptologic Systems Embedded Trainer provides realistic training to shipboard cryptology system operators and teams on their own tactical equipment, and can be integrated with the BFTT.

Surface Tactical Team Trainer (STTT) / Battle Force Tactical Trainer (BFTT)



The U.S. Navy's BFTT program develops prototype surface-ship combat system trainers and integrates them into a shipboard training network.

Source: U.S. Navy



USQ-T46 Battle Force Tactical Trainer (BFTT)

Source: L3Harris

Surface Tactical Team Trainer (STTT) / Battle Force Tactical Trainer (BFTT)



USS Antietam (CG 54) Ticonderoga-Class Guided Missile Cruiser

Source: U.S. Navy

Variants/Upgrades

Much of the surface warfare area of training and development is covered within the scope of PE#0204571N Consolidated Training Systems Development, Project 21427/22449 Surface Tactical Team Trainer/Battle Force Tactical Trainer. This research and development project is continuously being enhanced and modified as new technology becomes available.

Program Review

Background. Under the auspices of the U.S. Navy's PE#0604715N, Surface Warfare Training Devices, Project S1427, the STTT program developed a generic training system that replaced obsolete devices. The training system provides team procedural and tactical training/evaluation in a multi-threat environment for ships equipped with conventional and tactical data.

Project 1427 Surface Tactical Team Trainer. This project focuses on the development of BFTT/CSET systems to provide, both on individual ships and on submarines, realistic joint warfare training, including cryptology training, across the spectrum of armed conflict. These systems also serve to link these ships together for coordinated in-port training. Finally, the systems support the Afloat Training Organization and are the planned shipboard portion of the JTCTS program.

In FY93, PE#0604715N was phased out and various projects restructured and consolidated into a new program. The FY93 new start, PE#0204715N Consolidated Training Systems Development, carried over the STTT project from the Surface Warfare Training Devices program.

New Ways of Training Developed

In FY95, under the Amphibious Warfare Tactical Trainer segment of the program, attention was focused on developing interface and commonality requirements to automate the integration of Navy and Marine Corps wargaming systems. At the time, an update to the

Standard Ocean Acoustics Model (SOAM) for use in all surface trainer programs was in development. In other activity, development of the Mine Data Model and database was started, as was integration of the SSQ-94 Combat System Integrated Training Equipment with the BFTT.

Database Developed for Mine Warfare

BFTT work in FY96 included developing a mine warfare database and further developing the software modifications required to integrate the SSQ-94 with the BFTT. Development of the embedded operator training module and BFTT interface for the Amphibious Assault Direction Systems (AADS) started at this time as well.

In FY97, generic radio frequency and intermediate-frequency radar simulators were developed, and development of the Mk 91 NATO SeaSparrow Missile System Radio Frequency Simulator began.

The BFTT had reached Initial Operational Capability by FY98, at which time an automated interface to the Naval Warfare Tactical Database was developed, as were the software modifications required to incorporate amphibious and littoral functionality into BFTT. In FY99, development of the RF simulator for the Mk 91 NATO SeaSparrow Missile System was completed.

The agendas for FY00 and FY01 called for developing tactical link interface/simulation software and integrating Semi-Automated Forces (SAF) software into the BFTT. In FY03, the development of Battle Group-level display

Surface Tactical Team Trainer (STTT) / Battle Force Tactical Trainer (BFTT)

and debrief software was begun. Work also began on developing software for the Multi-Mission Team Trainer (MMTT).

Work in FY04 focused on the continued development of BFTT link simulation software. In October 2004, the BFTT operator course was offered fleet-wide.

Activity during FY05 and FY06 focused on incremental acquisition and fielding utilizing commercial off-the-shelf (COTS) technology in further developing the BFTT. In FY07, development continued of BFTT link simulation software for full integration. Work in FY08 focused on initializing the Government Acceptance Test (GAT) for BFTT Build 3.3.2 Phase II.

FY09 work focused on completion of BFTT Build 3.3.2, as well as scoping and defining the BFTT T46D Build. Activity for FY10 included a continuation of the GAT and a safety assessment of the BFTT Obsolescence Build (T46D), the incorporation of BFTT database architecture and content improvements to support a midlife upgrade of the combat system of the LSD 41/49 class, and continued development and integration of new software capabilities and system interfaces to address emergent requirements.

During FY11, development of the BFTT Software Build 3.5.1 for AEGIS Advanced Capability Build (ACB) 12 and LSD 41-49 class ships was completed, and final testing and certification begun. Also, requirements were finalized and design begun of BFTT Software 3.5.2 for the CVN 78 aircraft carrier.

Work during FY12 and FY13 included the fielding of BFTT Software Build 3.5.1 and continued development for other ship classes. These efforts continued through FY14.

The FY15 agenda called for continuing the Build 5.0 development required for the CVN 78 and AEGIS Baseline 9 and 7.2 backfit; integrating the CVN 78 Dual Band Radar and Cooperative Engagement Capability (CEC) Enhanced Trainer (CET); completing the Build 5.0 Test Readiness Review; and commencing the Build 5.0 test and evaluation. In other efforts, support was provided for Mk 2 Mod 6C engineering tests of the CVN 78 Ship Self-Defense System (SSDS) at Wallops Island for BFTT Build 5.0 integration and combat system "light off."

Also in FY15, the BFTT Build 6.0 Preliminary Design Review and related engineering and development analysis were conducted; the PDR of the AEGIS ACB16 combat system and SSDS was conducted; the Critical Design Review (CDR) was initiated; and interface control documents were prepared for use in hardware and software integration.

The Build 5.1 and 5.2 development required to support CVN 78 and AEGIS Baseline 9.C2 training capability continued from FY16 through FY17, and into FY18. In addition, a study was initiated to determine a way to simulate and integrate real-world environments within shipboard sensors for anti-area/area-denial (A2/AD) training.

In August 2017, Naval Sea Systems Command issued a pre-solicitation notice for an Integrated Training Systems tender for the production and engineering support of the Battle Force Tactical Trainer (BFTT) and the Advanced Training Domain (ATD). The UQS-T52 ATD system was an evolution of the existing BFTT which integrated the TI-16 Combat System Insertion 2016 computing hardware and display with a UQS-T52 rack. The FY18 budget called for the procurement of two UQS-T52 systems.

The agenda for FY18 called for conducting an Advanced Technology Demonstration 1.0 test and evaluation in support of AEGIS ACB16, Phase 2; delivering CEC embedded training capability and an IFF simulator, NULKA simulator, and MH-60R simulator for integration and testing; developing tactical representative training improvements to SSDS ACB20 by developing "own-ship weapon simulation" based on Evolved SeaSparrow Missile (ESSM) Block 2 models; and implementing electronic warfare training improvements based on SEWIP (Surface Electronic Warfare Improvement Program) Block 3 capabilities. The capabilities developed would be leveraged to enhance AEGIS as appropriate.

During FY19, the Advanced Technology Demonstration 1.0 system and software were delivered to support training on AEGIS Baseline 9.2.2 and SSDS Baseline 11.x. Additionally, BFTT 5.1.2 software updates were delivered to support the Fire Control Loop Improvement Program.

On January 6, 2020, the Center for Surface Combat Systems conducted its first training event for the On Demand Trainer portable AEGIS training device. Joint events were held at Naval Base San Diego and Naval Station Norfolk aboard USS Hamilton and USS Gettysburg.

Work during FY20-FY23 continued the development, integration, and testing of the ATD on AEGIS Baseline 10 and SSDS Baseline 11. Additional work focused on developing changes to the BFTT to incorporate the ATD Human Machine Interface to modernize the BFTT on ships lacking TI-16 computing and display infrastructure. Close-in weapon system simulator testing and integration with the BFTT and the ATD were completed during this timeframe.

Surface Tactical Team Trainer (STTT) / Battle Force Tactical Trainer (BFTT)**Funding**

		U.S. FUNDING							
		FY22	FY22	FY23	FY23	FY24	FY24	FY25	FY25
		<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>
RDT&E (U.S. Navy)									
PE#0204571N									
Consolidated Training Sys. Development									
Project 1427									
STTT		-	30.2	-	13.7	-	33.0	-	56.1
		FY26	FY26	FY27	FY27	FY28	FY28	FY29	FY29
		<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>
RDT&E (U.S. Navy)									
PE#0204571N									
Consolidated Training Sys. Development									
Project 1427									
STTT		-	43.7	-	25.7	-	24.8	-	N/A

All \$ are in millions.

N/A = Not Available

Source: U.S. Department of Defense FY24 RDT&E Budget Item Justification, R-2

Contracts/Orders & Options

Specific STTT contracts valued over \$5 million have been difficult to identify.

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
L3 Technologies	76.0	Apr 2019 – Contract to support U.S. Navy shipboard integrated training systems through instruction, engineering, systems integration, and life-cycle support for the BFTT family of training devices. (Contract award number not available.)
Lockheed Martin	20.7	Nov 2019 – A firm-fixed-price contract from the U.S. Navy for the design, fabrication, procurement, delivery, installation, and configuration of the tactical training devices of the Freedom variant of the Littoral Combat Ship installed at Naval Station Mayport, FL and Naval Station San Diego, CA. Contract also covers the provision of technical documentation plus testing, modernization and concurrency. Work was performed in Orlando, FL (51 percent); Moorestown, NJ (35 percent); Baltimore, MD (8 percent); Clearwater, FL (3 percent); and Marion, MA (3 percent), and completed in Mar 2022. Fiscal 2019 Other Procurement (Navy) funds in the amount of \$20,700,000 were obligated at time of award. This contract was not competitively procured, pursuant to U.S. Code 2304(c)(1). The U.S. Naval Air Warfare Center Training Systems Division, Orlando, FL, was the contracting activity. (N61340-20-C-0003)

Surface Tactical Team Trainer (STTT) / Battle Force Tactical Trainer (BFTT)

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Global Technical Systems	7.7	Apr 2022 – A firm-fixed-price modification to previously awarded contract N00024-18-C-5132 to exercise options for follow-on BFTT Operator Console (BOPC), T46E, and T52A production, engineering and technical support, and material and travel. Work was performed in Virginia Beach, VA, and was completed by Jan 2023. Fiscal 2022 Other Procurement (Navy) funds in the amount of \$3,233,338 (78 percent); fiscal 2021 Shipbuilding and Conversion (Navy) funds in the amount of \$693,052 (17 percent); and fiscal 2022 Other Command funds in the amount of \$231,017 (5 percent) would be obligated at time of award and would not expire at the end of the fiscal year. The Naval Sea Systems Command, Washington, DC, was the contracting activity.
Huntington Ingalls Industries Mission Technologies	134.0	Oct 2023 – Contract to provide requirements analysis, software engineering, development, integration and test support for the Advanced Training Domain (ATD), Battle Force Tactical Training (BFTT), BFTT Electronic Warfare Trainer (BEWT), Trainer Stimulator/Simulator Systems (TSSS) and the Combined Integrated Air and Missile Defense and Anti-Submarine Warfare Trainer (CIAT) platforms. Awarded by the Naval Sea System's Command's SeaPort Next Generation to support the Naval Surface Warfare Center Dahlgren Division Dam Neck Activity. Contract had a one-year base performance period with four option years.

Worldwide Distribution/Inventories

This is a **United States Navy** program, with related simulation and training work being conducted with the **Royal Australian Navy**. Per L3 Harris, over 700 BFTT systems have been installed in the U.S. on ships and in training facilities. Over 130 U.S. warships have been fitted with the BFTT system.

Forecast Rationale

The U.S. Navy's Surface Tactical Team Trainer (STTT) program develops the USQ-T46 Battle Force Tactical Trainer (BFTT) system to provide realistic combat system training. It can also link surface ships together for coordinated unit and battle group training using an Advanced Training Domain. The BFTT and Advanced Training Domain are the core systems used to integrate weapon system elements and combat system components to create the Total Ship Training Capability (TSTC).

These systems are continuously being updated as new tactics and technology are introduced.

R&D funding is expected to fluctuate slightly now that the latest enhancement has been completed (after slight delays resulting from the COVID-19 pandemic) and taper off as the focus turns to additional ship installation and enhancements. The continued need for tactical training means the evolving variants of these trainers will maintain a steady demand from U.S. Navy customers.