

Expeditionary Sea Base (T-ESB) (Formerly Mobile Landing Platform Afloat Forward Staging Base (MLP(AFSB)))

Executive Summary

- In October 2017, DOT&E published a classified combined IOT&E and LFT&E report assessing T-ESB operational capability. This report was based on the IOT&E completed in August 2016 and the LFT&E, which included a Total Ship Survivability Trial (TSST), completed in August 2016.
- In August 2017, the Navy commissioned USS *Lewis B. Puller* (ESB 3), formerly USNS *Lewis B. Puller* (T-ESB 3), the first T-ESB. The Navy conducted all test activities discussed in this report on T-ESB 3; therefore, for consistency, this report refers to the ship as T-ESB.
- The T-ESB is operationally effective and suitable in supporting airborne mine countermeasures (AMCM) missions in a non-hostile environment.
- The T-ESB met the Navy's requirement to transit 9,500 nautical miles (nm) at 15 knots while fully loaded with an AMCM helicopter squadron including all countermeasures equipment.
- Self-defense capability is limited to crew-served weapons only. The T-ESB was designed to operate in a non-hostile environment with low/negligible threats to the ship. However, mine countermeasure (MCM) operations may require the ship to operate close to littoral threat areas. The lack of self-defense capability renders the ship dependent upon other naval combatants and joint forces for protection in the littoral operating environment.
- The T-ESB LFT&E program was adequate to support the DOT&E survivability assessment, and recommendations are published in the classified IOT&E and LFT&E report.

System

- T-ESB is a heavy-lift ship based primarily on the British Petroleum *Alaska*-class oil tanker design. The cargo area has been modified with a large mission deck, elevated flight deck (with aircraft hangar facilities), and military accommodations and workspaces for 250 personnel. The ship utilizes the same base ship as the Expeditionary Transfer Dock (T-ESD) class.
- The Navy built T-ESB to support AMCM missions, hosting up to four helicopters, MCM equipment, and associated support equipment.
- The ship is crewed with both Military Sealift Command (MSC) and U.S. Navy personnel.
- The Navy intends for T-ESB to replace USS *Ponce*, an *Austin*-class Amphibious Transport Dock commissioned in 1971. However, while USS *Ponce* is able to support the legacy triad of MCM forces – airborne, surface, and explosive ordnance disposal (EOD) along with the coordination staffs – the Navy built T-ESB to support only the AMCM mission.



- The Navy modified the ship to support Special Operations Forces (SOF) missions.
- The T-ESB design incorporates survivability features evaluated through the LFT&E program, to include:
 - Distributed firefighting equipment (in the form of a fire main and aqueous film-forming foam) and distributed damage control lockers/repair stations
 - Retractable bow thruster for station-keeping and limited emergency propulsion
 - Emergency electrical power to selective ship loads by way of the Emergency Diesel Generator (EDG)
 - A carbon dioxide gaseous flooding system in main engineering, EDG spaces, and spaces with high risk of fuel-induced fires
 - An aviation crash locker, due to T-ESB's more aviation-focused mission, to handle shipboard aviation casualties
 - A seawater sprinkling system for the protection of magazines and other high-risk spaces in the forward portion of the ship

Mission

Combatant Commanders use the T-ESB to support AMCM operations, to support SOF during Helicopter Assault Force and Boat Assault Force operations, to host explosive ordnance demolition teams, and as a strategic landing platform to support crisis response, counter-piracy operations, maritime security operations, and humanitarian aid/disaster relief missions.

Major Contractor

Base ship and T-ESB mission package: General Dynamics National Steel and Shipbuilding Company (NASSCO) – San Diego, California

Activity

- The Navy completed SOF upgrades on T-ESB 3 during Post Shakedown Availability (December 12, 2016, through April 30, 2017). NASSCO performed the work in Norfolk, Virginia, and the Navy conducted certification tests. Following these tests, the Navy deployed the ship. No operational test was conducted.
- In May 2017, the Navy's Operational Test and Evaluation Force published a classified IOT&E report on T-ESB.
- The Navy completed and delivered the T-ESB Final Survivability Assessment Report (FSAR) to DOT&E in August 2017.
- In August 2017, the Navy commissioned USS *Lewis B. Puller* (ESB 3), formerly USNS *Lewis B. Puller* (T-ESB 3), the first T-ESB.
- In October 2017, DOT&E published a classified combined IOT&E and LFT&E report on T-ESB based on post-delivery test and trials as well as the IOT&E and LFT&E that were completed in August 2016. IOT&E included cyber testing; LFT&E included a TSST.
- NASSCO plans to deliver two more T-ESB ships: hull 4 in March 2018 and hull 5 in May 2019. It delivered the first T-ESB (hull 3) in June 2015.

Assessment

- The T-ESB is operationally effective and suitable for supporting AMCM missions in a non-hostile environment.
 - The ship demonstrated high operational availability during testing, experiencing only four operational mission failure events and meeting the Navy's requirement for Mean Time Between Critical Failures.
 - The T-ESB demonstrated the ability to successfully support both day and night launch and recovery operations of AMCM aircraft, fueling at sea, and vertical replenishment operations.
 - The T-ESB met the Navy's requirements for the stowage, handling, and maintenance of four MH-53 helicopters as well as the mine-sweeping equipment sets needed to support AMCM operations.
 - The ship met the Navy's endurance requirements, exceeding the requirement to transit more than 9,500 nm at 15 knots without refueling.
 - By design, the ship has a 10 day capacity for chill/freeze/dry stores needed to support embarked military personnel. If fully manned, including AMCM squadron personnel, the ship would require chill/freeze/dry stores resupply twice during a 9,500 nm transit.
 - The ammunition magazines accommodate AMCM ordnance.
 - The aircraft maintenance shops surrounding the hangar bay lack air conditioning, which may limit the length of work days when operating in warm climates that may introduce heat stress conditions.
 - Per the Navy's requirement, the ship is not configured to concurrently accommodate explosive ordnance detachment personnel and equipment, the MCM staff required to

- coordinate the operations, and an AMCM helicopter squadron during MCM operations. Consequently, additional ships would be required to accommodate these personnel and their equipment during MCM operations.
- The T-ESB is survivable against typical commercial ship hazards such as groundings, collisions, raking, and fires. In expected, non-permissive environments (e.g., littorals), the T-ESB is largely dependent upon other naval combatants and joint forces for protection. Lack of military survivability capabilities introduces the following shortfalls:
 - The ship does not have chemical, biological and radiological defense capability, including a countermeasure wash-down capability.
 - The ship lacks a self-defense capability against likely threats in the littoral operating environment. Self-defense is limited to crew-served weapons only.
- The TSST revealed ship design deficiencies associated with emergency lighting, personnel egress, and the watertight and interior doors. The trial also identified limitations with ship communications systems that challenged damage control effectiveness as well as the coordination of Navy and MSC crews.
- Cybersecurity test results and analysis are provided in DOT&E's classified IOT&E and LFT&E report.
- After T-ESB 3 received the SOF upgrade, Naval Air Systems Command (NAVAIR) certified the ship to have a maximum of four aircraft on the flight deck at any time with the limitation that only two aircraft are permitted to operate (engage rotors) simultaneously. NAVAIR certified ScanEagle as the only unmanned air vehicle approved to operate on this platform. The Navy demonstrated the crew's ability to deploy a Combat Craft Assault boat, an asset needed for SOF missions.

Recommendations

- Status of Previous Recommendations: The Navy has not addressed the FY15 recommendation to install a separate Ship Service Diesel Generator to minimize periods of under-loading of the Main Diesel Generators.
- FY17 Recommendations. The Navy should:
 1. Conduct FOT&E to determine the effectiveness of T-ESB to conduct SOF missions.
 2. Improve the ship's self-defense capabilities.
 3. Fix or mitigate all identified cybersecurity vulnerabilities as identified in the DOT&E report and conduct a follow-on cybersecurity test.
 4. Mitigate the effect of casualties and improve ship recoverability by incorporating redundancies in the distribution of medical equipment, firefighting, and egress systems.
 5. Modify firefighting documentation and training to coordinate efforts among the MSC crew, military detachment, and aviation detachment to improve ship recoverability.
 6. Consider the complete list of recommendations in DOT&E's classified IOT&E and LFT&E report.