

Joint High Speed Vessel (JHSV)

Executive Summary

- The Navy completed IOT&E and LFT&E of the Joint High Speed Vessel (JHSV) in January 2014. Additionally, the Navy conducted the first of two FOT&E events in June and October 2014. The first event consisted of mooring operations with the Mobile Landing Platform with the Core Capability Set (MLP (CCS)). The second test event will consist of launching and retrieving the seal delivery vehicle from the JHSV while at sea.
- DOT&E issued the classified combined IOT&E and LFT&E report on July 17, 2014, and found JHSV effective and suitable with the following limitations:
 - JHSV did not meet its fully loaded transit speed and distance requirement (600 short tons at 35 knots for 1,200 nautical miles). Testing results support 600 short tons at 31 knots for 858 nautical miles.
 - USNS *Spearhead* (JHSV-1) had an unexplained weight growth of over 47 short tons (specific ship weights may vary hull to hull), which contributed to the fully loaded transit range deficit since it limited the amount of fuel the ship could carry without exceeding maximum draft.
 - JHSV is slightly limited in self-deployment range, with test results supporting a 4,000 nautical mile unrefueled transit compared to the 4,700 nautical mile requirement.
 - Small boat operations from JHSV are limited to Sea State 2 or less until procedures are identified to allow higher Sea State boat operations.
 - JHSV's cybersecurity is not satisfactory because of numerous significant Information Assurance deficiencies.
 - Initial observations and assessment indicate deficiencies exist with skin-to-skin mooring operations with MLP (CCS). In the first test, several mooring lines parted, precluding completion of the test event. In the second test, the mooring line issue was resolved but the JHSV ramp suffered a casualty, precluding completion of the test.
 - JHSV is survivable only if used in a non-hostile environment. The ship has no self-defense capability other than crew-served weapons; it requires augmentation with a Navy self-protection team (Embarked Security Team), and is built to commercial, high-speed craft specifications that do not include hull, equipment, or personnel protection features necessary to survive weapons effects. The ship has only rudimentary capability for crew protection in chemical or biological threat environments.
 - Although JHSV testing shows overall ship operation suitability, the ship service diesel electric generators did not meet its anticipated reliability.



payloads of cargo for the joint force. It bridges the gap between large capacity low-speed sealift and small capacity high-speed airlift.

- JHSV is a redesign of a commercial catamaran capable of accessing relatively austere ports. Classified as a non-combatant, JHSV has limited self-protection capability. Design characteristics include the following:
 - Propulsion provided by four water jets powered by diesel engines
 - At-sea refueling capability
 - Support for 312 embarked troops for up to 96 hours or 104 troops for 14 days
 - Integrated ramp capable of load/off-load of military vehicles including combat-loaded main battle tanks (M1A2)
 - Flight deck with helicopter refueling capability

Mission

Combatant Commanders will use the JHSV to support the flexible, agile maneuver and sustainment of combat forces between forward operating bases, ports, austere littoral access points, and the sea base. Specifically, Combatant Commanders may employ the JHSV in a transport/resupply role in benign, non-hostile environments to:

- Rapidly transport medium payloads of Marine Corps or Army cargo and combat-ready troops over intra-theatre distances between shore nodes
- Deliver troops, combat-loaded vehicles, and equipment ready to be employed, requiring only ports with pier or quay wall access and no other infrastructure
- Support sustainment of forces between forward operating bases, ports, and austere littoral access points that would be prohibitive for larger ships to access

System

- The JHSV is a high-speed, shallow-draft surface vessel designed for intra-theater transport of personnel and medium

Major Contractor

Austal USA – Mobile, Alabama

FY14 NAVY PROGRAMS

Activity

- The Navy's Commander, Operational Test and Evaluation Force and Marine Corps Operational Test and Evaluation Activity conducted testing on USNS *Spearhead* (JHSV-1), USNS *Choctaw County* (JHSV-2), and USNS *Millinocket* (JHSV-3) during the following test periods:
 - Post Delivery Test and Trials (PDT&T), February 2013 through July 2013
 - Dedicated IOT&E and live fire testing, July 2013 through August 2013
 - PDT&T, August 2013 through January 2014
 - Partial FOT&E, June and October 2014
- These tests were conducted at sea while transiting from the manufacturing facility in Mobile, Alabama, to their home port Joint Expeditionary Base Little Creek in Fort Story, Virginia; in the Virginia Capes area; and while in port at the Norfolk Naval Base, Virginia. The FOT&E events were conducted in Long Beach harbor, California, in June 2014, and at sea off Camp Pendleton, California, in October 2014.
- Personnel from the Combatant Craft Division of Naval Surface Warfare Center Carderock Division assisted in testing of the Rigid Hull Inflatable Boat (RHIB) launch and recovery with Sea State 3 in September 2013.
- Personnel from the Naval Surface Warfare Center (NSWC), Port Hueneme, California, conducted an underway replenishment (fuel receive only) ship qualification on USNS *Choctaw County* both in port at Norfolk Naval Base and underway in October 2013.
- Naval aviators from Norfolk Virginia Naval Air Station operated an MH-60S helicopter off the JHSV to complete the final operational test. Both the JHSV helicopter fueling and power systems, which Naval Air Systems Command testers had initially found to be deficient during tests in 2013, were retested after completion of required repairs and modifications.
- On May 19, 2014, DOT&E approved the JHSV FOT&E test plan. FOT&E consists of two test events: demonstration of the transfer capability of Marine Corps vehicles between JHSV and MLP (CCS) while at sea during day and night (interface tests), and the launch and recovery of the seal delivery vehicle from the JHSV while at sea.
 - The Navy attempted to conduct a day and night interface test, mooring of the JHSV to the MLP (CCS) vessel, during the week of June 23, 2014. USNS *Millinocket* (JHSV-3) moored skin-to-skin with USNS *Montford Point* (MLP-1) and Marine Corps vehicles transited back and forth during daylight. The vehicle transfer in daylight was completed successfully, but five mooring lines broke, prompting cancellation of the night test.
 - The Navy attempted a second interface test on October 29, 2014, at sea off Camp Pendleton, California. The mooring line issue was resolved, but the JHSV ramp suffered a casualty, prompting cancellation of further vehicles transfer after recovering the first vehicle and precluding completion of the test.
- All tests were conducted in accordance with a DOT&E-approved test plan.

Assessment

- The classified DOT&E combined IOT&E and LFT&E report states that the JHSV is effective and suitable with some limitations. The assessment is inclusive of activities from FY13 and FY14. Further details of the following assessment are identified in the classified report.
- JHSV is capable of fueling at sea.
- The JHSV ramp can accommodate all anticipated vehicles to a pier/quay wall and to a Roll On/Roll Off Discharge Facility (floating causeway) during Sea State 1 conditions, as normally found in protected harbors (the ramp was not designed for higher sea states).
- JHSV cannot achieve the required 23 knot, 4,700 nautical mile light-ship self-deployment transit. Calculations show it will be short by 682 nautical miles if it started with a 90 percent starting fuel load and was allowed to use all but the final 10,000 gallons in storage.
- JHSV cannot make the required 35 knot, 1,200 nautical mile fully loaded (600 short tons) transit. Calculations indicate it can make a 31 knot, 858 nautical mile transit. Longer and faster transits will require refueling from a tanker.
- There is an unexplained 47.7 short ton growth in the JHSV-1 ship weight that represents 13,700 gallons of fuel that cannot be loaded without exceeding maximum draft (maximum total ship and cargo weight).
- With an embarked security team, which includes both personnel and weapons, JHSV can engage a moving surface threat. However, testers identified the following safety problem: 0.50 caliber gun operators are vulnerable to falling overboard during high seas or radical ship maneuvers due to the lowering of lifelines during gun use.
- JHSV manning and facilities can accommodate handling of all required unarmed helicopters including providing fuel and power.
- The JHSV crew demonstrated day and night vertical replenishment with MH-60, MH-53, and MV-22.
- After completion of required repairs and modifications, the JHSV crew successfully retested the JHSV helicopter fueling and power systems, which Naval Air Systems Command testers had initially found to be deficient during tests in 2013.
- The JHSV crew demonstrated efficient loading, securing, and unloading of Marines and their equipment from II Marine Expeditionary Force, including their rolling stock.
- The JHSV crew demonstrated the 96-hour requirement for transporting and feeding 312 combat troops by supporting 354 people over that period.
- In August 2013, the crew only successfully demonstrated the capability to launch two 11-meter RHIBs within 40 minutes in Sea State 2 (wave heights up to 2 feet). The requirement is to conduct this operation in Sea States up to 3 (wave heights up to 4 feet). Looking for Sea State 3, the Navy conducted a second attempt in September 2013. However, the Ship's Master cancelled attempts to launch a RHIB in Sea State 3 due to safety concerns.

FY14 NAVY PROGRAMS

- The ship's crew demonstrated the underway requirement to move a 27,000-pound container from the mission bay to the flight deck and back in Sea State 3.
- The JHSV's organic Cargo Loading Trailer is not effective for loading 20-foot long metal storage containers. During the IOT&E, the test team took five hours to connect the Cargo Loading Trailer with a storage container and failed to load it aboard the ship. A 20-foot storage container was loaded at the ship home port where ramp access from the pier was less restrictive.
- The ship service diesel electric generators installed in JHSV demonstrated poor reliability during the test period. Their target Mean Time Between Failure was 2,496 hours, but was measured to be only 208 hours.
- Cybersecurity testing found numerous significant Information Assurance vulnerabilities and an absence of written instructions and procedures to guide shipboard network administrators.
- Initial observations and assessment indicate deficiencies exist with skin-to-skin mooring operations with MLP (CCS). Although mooring line issues that arose in early testing were resolved, the JHSV ramp does not seem to be able to handle the small but continual relative movement of the two ships when moored skin-to-skin.
- JHSV is survivable only if used in a non-hostile environment. The ship has no self-defense capabilities other than crew-served weapons; it requires augmentation with a Navy self-protection team; and is built to commercial, high-speed craft specifications that do not include hull and equipment hardening or personnel protection features necessary to survive weapons effects.
- Vulnerability modeling identified a significant risk of casualties if JHSV is used in Major Combat Operations and put in harm's way. Small civilian crews operate the ships and are trained and equipped to recover from small-scale casualties, not those likely in major combat operations.

Recommendations

- Status of Previous Recommendations. The Navy addressed two of the six FY13 recommendations. The Navy still needs to determine the best self-deployed transit speed to achieve the 4,700 nautical mile unrefueled range requirement, a transit speed that allows for a 600 short ton load delivery to 1,200 nautical miles, and an outfitted weight for each hull to enable mission planners to characterize fully loaded transit capability. The Navy also still needs to evaluate design improvements identified during the Total Ship Survivability Trials and implement those that will enhance the ship's survivability.
- FY14 Recommendations. The Navy should:
 1. Review and modify tactics, techniques, and procedures to safely launch RHIBs in Sea States greater than Sea State 2.
 2. Consider a replacement for the Cargo Loading Trailer if a JHSV is utilized routinely to transport 20-foot storage containers
 3. Implement a reliability growth program for the ship service diesel electric generators.
 4. Resolve and retest the significant Information Assurance vulnerabilities identified in the classified DOT&E combined IOT&E and LFT&E report.
 5. Address lack of written instructions and procedures to guide shipboard network administrators.
 6. Provide safety lanyards and harnesses for embarked security team members that man gun mounts. Additionally, provide hands-free communication devices to help coordinate firing engagements.
 7. Investigate casualty problem with JHSV's ramp that occurred during interface test with MLP (CCS) in October 2014. If necessary, reevaluate the need for at sea skin-to-skin operations between JHSV and MLP (CCS).
 8. Complete JHSV FOT&E with the launch and recovery of the seal delivery vehicle.

FY14 NAVY PROGRAMS