Army Transformation at Sea: The New Theater Support Vessel

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THE ARMY'S NEW Theater Support Vessel (TSV) is a rapidly developed response to the transformational operational maneuver and sustainment demands of force-projection operations. The TSV is a fast-moving, shallow-draft vessel that can simultaneously move troops and their equipment together as combat-ready units within theater and deploy them with little or no reception, staging, onward movement, and integration (RSOI) activities at undeveloped ports. The TSV also provides follow-on sustainment through joint logistics over-the-shore (JLOTS) operations.

Operations Desert Storm and Iraqi Freedom highlighted the need for maneuver-force and logistics transformation. To respond quickly to threats around the world, the U.S. Army must field highly lethal, deployable units and the sustainment forces to move and support them. The speed at which forces must deploy and be available for battle changes the paradigm of moving troops separately from their containerized equipment and then remarrying them and unpacking and reorganizing equipment at the destination port. While the separate intertheater movement approach will still exist, the concept of intratheater maneuver of combat-ready units (troops and equipment together) provides the theater commander with an operational capability to bypass defended or major ports and inject combat power anywhere. Evolving force-projection doctrine requires inserting combat-ready units by air and sea into undeveloped theaters of war to gain and maintain the operational initiative. By design, the TSV can rapidly maneuver a combat-ready force over operational distances, provide continuous Battle Command On-The-Move (BCOTM), and facilitate insertion and operational sustainment of the force once ashore.

Meeting Force-Projection Requirements

In "Enabling Operational Maneuver from Strategic Distances," Brigadier General Huba Wass de Czege and Lieutenant Colonel Zbigniew M. Majchrzak note: "One consistent study finding . . . has been that . . . Shallow-Draft, High-Speed Ships (SDHSS)[sic]—because of their speed, throughput capability, and capacity—most significantly impacted force closure. The [TSV] was initially used in a strategic role. Thereafter, it was another source of agility and flexibility as it allowed the [joint force commander] to insert combat power and sustainment with precision in a quickly changing environment. Not limited to ports, the TSV could operate at countless locations along the coast without losing efficiency."[1] For the past 3 years, TSV prototypes have proven this conclusion correct in the Iraqi theater of operations. When the Army fields the Future Combat System, a suitable Army watercraft will already be combat-tested to support it (figure 1).

Operations Desert Storm and Iraqi Freedom demonstrated the blurring of strategic, operational, and tactical boundaries. With the technological capability to deliver strategic and operational intelligence and firepower to the tactical battlefield, and with the speed of tactical maneuver forces, operations are increasingly evolving toward an integrated close/deep battlefield and continuous (versus phased) operations. Perhaps more than any other system, the TSV design reflects this new paradigm's demands.

As a maneuver and sustainment asset, the TSV faces several unique command, control, communications, computer, intelligence, surveillance, and reconnaissance (C4ISR) challenges. First, it operates in a joint military as well as a civil/maritime environment. Second, it supports combat, combat support, and combat service support activities. Finally, its operations

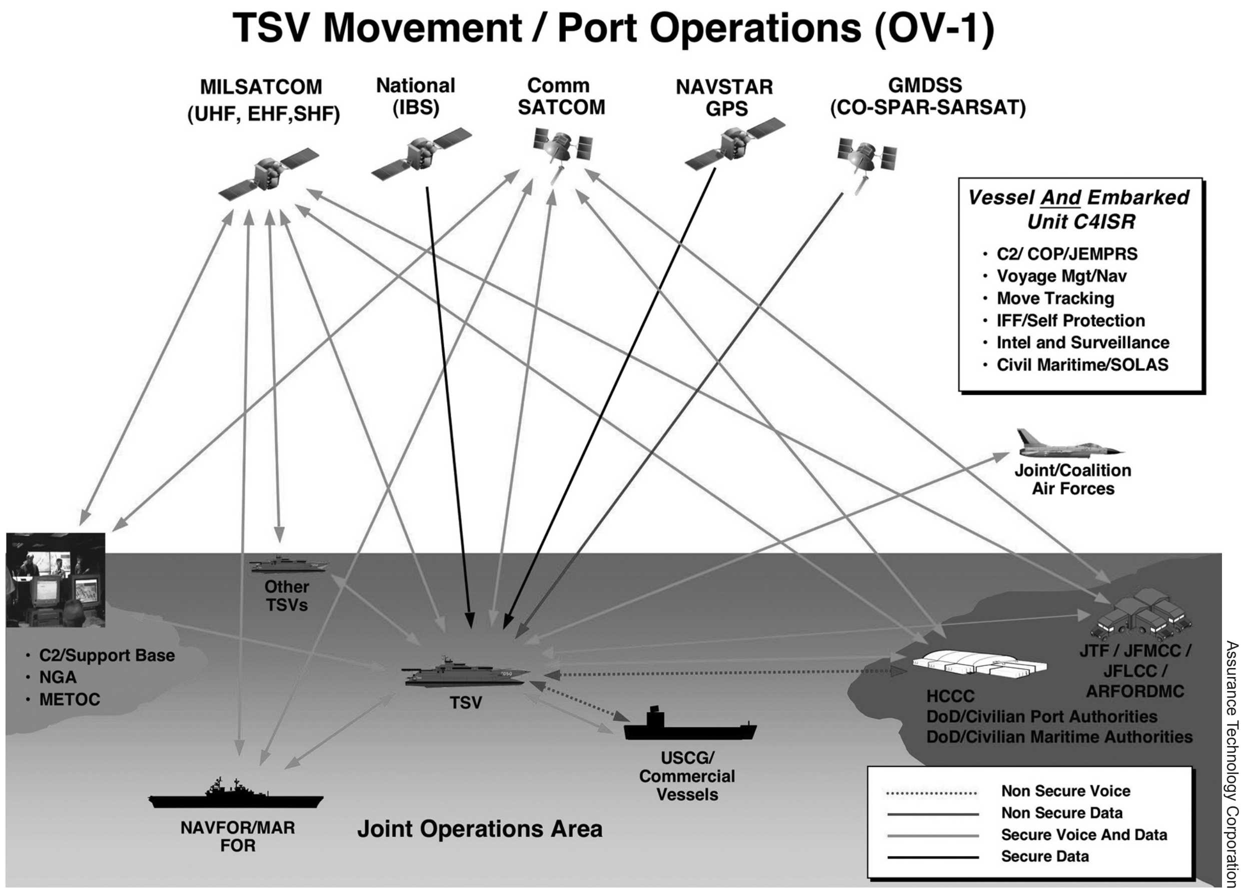

Figure 1. OV-1 Army battlefield digitization reaches into the littorals.

cross strategic, operational, and tactical echelons, so it must interface with the worldwide maritime communications prerequisites mandated by the Global Maritime Distress and Safety System and the Safety of Life at Sea treaties, the Navy's FORCEnet architecture, and the Army's LandwarNet command and control (C2) systems. TSV's battle command center (BCC) offers transformational capabilities by replicating a command post and supporting BCOTM. Potential future missions for this robust asset include en-route mission planning and rehearsal (deploying "ready to fight"); deployable joint C2; Homeland Security operations; humanitarian operations; or operations other than war.

The TSV breaks previous paradigms by greatly reducing RSOI (time and costs at destination) by avoiding separate deployment of combat unit personnel and equipment, and by combining C4I operational maneuver and logistics capabilities into a single platform. Establishing this new paradigm (supporting operational maneuver and operational logistics worldwide for both inter- and intratheater movement), the TSV fulfills more C4ISR interoperability requirements than any other transformational platform. (TSV C4ISR interoperability encompasses civil/maritime and joint, combined, and coalition forces from battalion to echelons above corps and spans all battlefield operating systems and domains.)

The strategy is to integrate proven, state-of-the-art technologies using a system-of-systems approach with an open system architecture to meet user demands. TSV C4ISR requirements can be divided into two major categories: vessel and embarked unit operations.

Vessel operations. Vessel capabilities include civil/maritime communications, electronics, and navigation (CEN) and military applications. These capabilities support bridge operations, enabling the TSV to use voice and data communications to coordinate its movement through international waters and to conduct port operations. Both civil and military port authorities are moving toward advanced C2 and vessel identification systems. The Coast Guard's Deepwater program and the Army Harbormaster Command and Control Center seek to upgrade what were primarily voice capabilities to joint and interagency digital communications for voice and data interoperability.

TSV's design anticipates operations in these complementary architectures. Movement within the military maritime environment involves close coordination with friendly sea and air forces to ensure multidimensional security in areas where the TSV might be independently maneuvering and to prevent fratricide. TSV's transition through joint and Army command boundaries between and within theaters requires considerable communications capabilities and planning. When compared to previous, slow-moving logistical convoy actions, the demands of the TSV's concept of operations (CONOPS) exceed previous Army watercraft operations and greatly increase requirements for coordinating and integrating its activities by the theater operations, logistics, and signal staffs. The TSV will participate in Army and Navy satellite communications (SATCOM) architectures, has an international maritime satellite capability, and will directly receive intelligence broadcasts.

The TSV is equipped for self-deployment between theaters using both military and civil maritime C4ISR equipment suites with full-spectrum communications interoperability.[2] Data communications via Global Command and Control Systems-Army (GCCS-A) and Maritime (GCCS-M) and Blue Force Tracker software maintain land, air, and sea situational awareness and transmit the TSV's location to the joint common operating picture (COP).

The TSV uses an electronic monitoring system called the Integrated Engineering Control and Surveillance System to track performance of all major engineering, propulsion, and navigation equipment. Sensors throughout the vessel provide continuous feedback to the bridge on the vessel's health and maintenance status, reducing the requirement for a larger crew. Forward-looking infrared radar/millimeter-wave, driver-viewing enhancements, electronic mapping, and underwater survey equipment ensure the TSV can move in degraded weather conditions and with stealth in low light conditions.

Vessel operations also include a self-protection capability. As a noncombatant, the TSV anticipates coverage and protection from the Navy's force-protection umbrella. The TSV's C4ISR system-of-systems architecture requires a highly reliable, highly autonomous self-protection suite of multispectral detectors and responders ranging from the passive through the nonlethal to hard-kill mechanisms. All of these subsystems will be part of the Integrated Bridge System and can be operated from one or more remote weapons stations.

Embarked-unit battle command. The Objective Battle Command Concept stresses the need for a C2 capability for en-route movement of troops: "Objective Force commanders will exercise continuous command over their forces. This encompasses the full deployment cycle, from time of alert to redeployment. *From whatever location the commander chooses, commanders should have access to the common operational picture, the ability to collaborate with other commanders, and the ability to access key members of the staff.* Commanders retain this capability whether they are at home station, *en route to the area of operations*, operating from their own command post, exercising command from a subordinate or adjacent command post, moving inside their command vehicle, or on foot with a personal digital device" (emphasis added).[3]

The Army vessel TSV-1X *Spearhead* meets this transformational concept today. The TSV is equipped with an on-board BCC to support continuous C2 of an embarked unit during all phases. Battle command center capabilities encompass C2 operations using Army Battlefield Command Systems, Global Command and Control Systems-Joint (GCCS-J), Blue Force Tracker, collaborative tools, visualization/rehearsal software, and wideband SATCOM. A shipwide local area network (LAN) and intercom system support intravessel and off-board voice, data, and video-teleconference (VTC) interoperability with other C2 nodes. The BCC gives the TSV the ability to deliver ready-to-fight combat units.

In May 2004, *Spearhead* demonstrated BCOTM in a JLOTS Advanced Concept and Technology Demonstration (ACTD) at the Force Projection Symposium at Norfolk, Virginia. Recently returned from real-world operations in the Iraqi theater of operations, the TSV-1X had proven its value in littoral sustainment operations. TSV-1X's participation in the JLOTS was intended to highlight its transformational role as a theater maneuver asset and the unique C4ISR capabilities it offers in joint operations.

The demonstration provided a perfect context for conducting BCC operations by a notionally embarked unit during intratheater movement. The ACTD scenario involved the embarkation of notional Stryker Brigade Combat Team (SBCT) elements (equipment and personnel), BCOTM, and mission planning/rehearsal during intratheater movement and debarkation via JLOTS onto an undeveloped beach.

A simulation from Headquarters, U.S. Communications and Electronics Command (CECOM), of a 3d Infantry Division (ID) action in Iraq drove the scenario. A BCOTM Stryker vehicle and a heavy HMMWV were loaded on the TSV and connected to the shipwide LAN. A notional staff manned the BCC connected to a

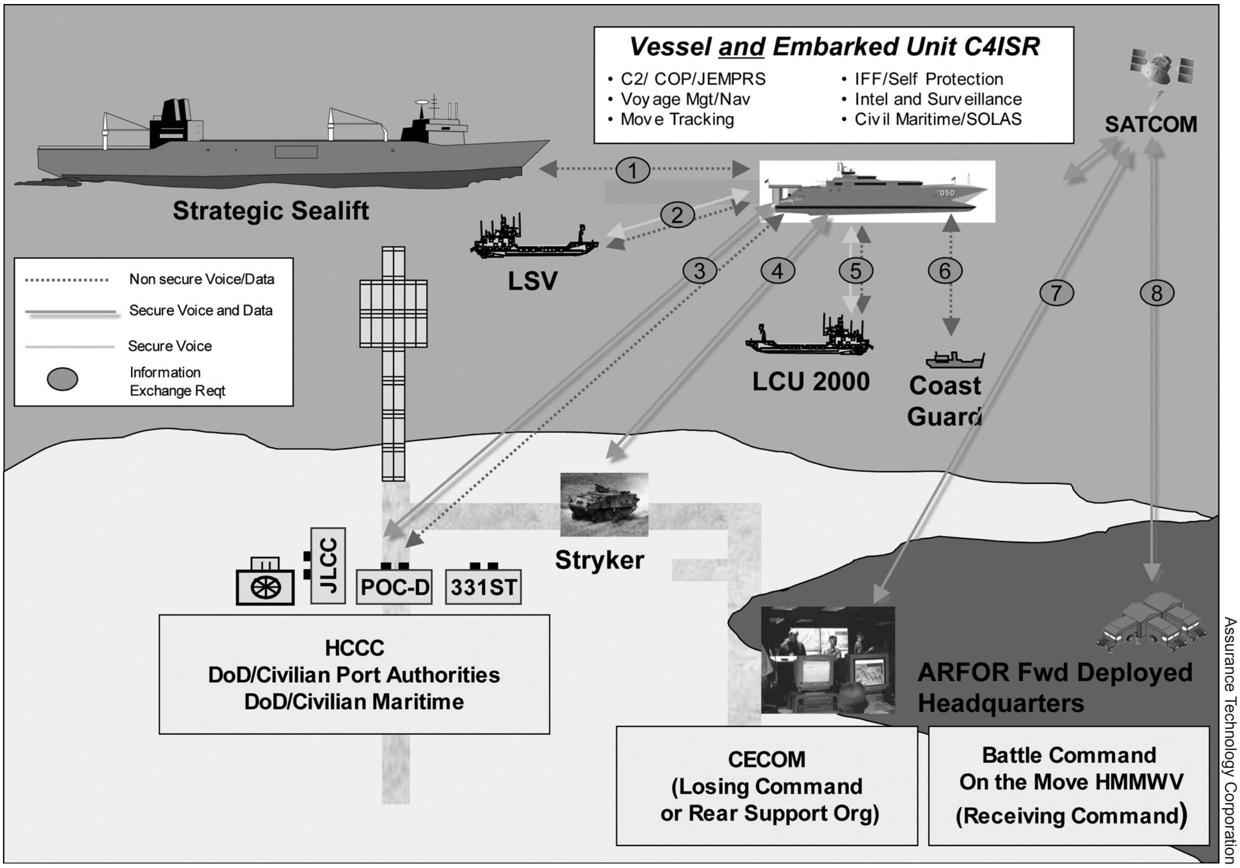

Figure 2. JLOTS C4ISR ACTD scenario.

sanctuary command center to obtain theater COP and division-level common tactical picture updates as well as mission changes.

During the demonstration, all battle command activities (voice, data, and VTC) were provided via LAN to the BCOTM Stryker and HMMWV in the hold of the vessel. Battle command was maintained continuously during actual TSV movement from the embarkation port to the JLOTS beach location during JLOTS execution and troop unit debarkation. On arrival at the roll-on/roll-off discharge facility (RRDF), the notional SBCT disembarked with its command vehicles updated with the most current battle command/COP information and joined its receiving command with little or no RSOI. The vessel used its own CEN suite to coordinate and execute port operations, navigation, and JLOTS activities, including change of mission to an unplanned port.

Critical C4ISR links. Figure 2 depicts the JLOTS scenario with TSV communications links to various vessels, vehicles, and command centers (numbered 1 through 8). Links 1, 2, 3, 5, and 6 were accomplished using the TSV commercial Integrated Bridge System. Using civil/maritime VHF radios, the TSV crew coordinated navigation from the port to the JLOTS site as well as maneuvers around the RRDF. Such communication represents typical information exchange requirements (IERs) related to inter- and intratheater movement. During the JLOTs exercise, the TSV demonstrated its effectiveness by meeting 19 of 23 critical operational requirements document (ORD) IERs, including the following:

- Bridge to bridge. Links 1, 2, 5, and 6 correspond to the ORD critical IERs for the coordination of TSV navigation and safe passage with other maritime traffic.
- TSV to Port Authorities. Link 3 corresponds to several critical IERs, including coordination of entry to and departure from ports of embarkation and debarkation; conduct of cargo upload and discharge operations; and changes of mission.
- Other. Other critical IERs demonstrated include "TSV commander requests/receives navigational and weather information (NAVTEX broadcasts)," and "Obtain own ship position via Global Positioning System." Both were accomplished as a normal part of vessel operations during the event.
- Continuous battle command by embarked unit. Links 7 and 8 were performed via wideband SATCOM

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The US Army Theater Support Vessel (TSV).

between the TSV and the sanctuary command center at CECOM headquarters and were the focus of the ACTD. Both voice and data, including VTC, were used in battle command activities that included preembarkation, embarkation, and en-route battle command, mission planning, and rehearsal. ORD critical IERs demonstrated include the following:

•• Operational commander requests movement of forces/sustainment.

•• TSV/embarked unit commander requests/receives COP update.

•• TSV commander coordinates force protection.

•• TSV commander updates COP with TSV position (Blue Force Tracker).

•• TSV/embarked unit commander issues situation reports to headquarters.

•• Coordination of maintenance support/resupply.

•• Embarked unit commander/battle staff collaboratively revise mission plan (with higher headquarters).

•• Embarked unit commander issues revised OPLAN/conducts en-route rehearsal (within BCC).

A Leader in Logistics Transformation

While the TSV's operational maneuver and battle command capabilities are impressive, the TSV contributes equally to logistics transformation in both Army and joint operations. TSV participation in real-world operations in the Iraqi theater and in joint exercises has proven its transformational sustainment capabilities. Increasing the speed of deployment and employment carries with it a concurrent need for more mobile sustainment platforms.

In "Sustaining Expeditionary Forces," Major General Terry E. Juskowiac and Colonel Michael Williams point out that *"[g]enerating sustainment will require dual-capability mobility and distribution platforms, a much greater integration of operations and sustainment than ever before across the joint force,* and finally, a process that can sense and react to dynamic battlefield conditions and the natural tension between operations and sustainment requirements" (emphasis added).[4] The TSV design is meeting this challenge by reducing the battlespace logistics footprint, enhancing strategic mobility and deployability, and reducing logistics costs without affecting warfighting capability or readiness.

Reducing the logistics footprint. The TSV reduces the logistics footprint in the battlespace by carrying combat-ready sets of troops and equipment together, virtually eliminating the need for RSOI activities at a port. In fact, its shallow draft allows it to deliver sustainment where no logistics footprint exists. Another important TSV logistics enabler is its compliance with the common logistics operating environment via its ability to provide in-transit visibility (ITV) of its cargo. The content of cargo the TSV carries is known and is tracked continuously from loading through unloading. Automatic information technology, in the form of radio frequency identification tags/readers and a Movement Tracking System on board ensure continuous ITV of cargo to the logistics COP. As these capabilities are integrated with the GCSS-A, the TSV will provide full logistics tracking in the Joint Total Asset Visibility System.

Enhancing mobility and deployability. The TSV enhances strategic mobility and deployability through its range, speed, and shallow draft. The TSV's threshold operational range is 1,250 nautical miles. With loaded speeds up to 40 knots, this represents a quantum leap in mobility over its 10-knot predecessors, many of which are approaching the end of their useful lives. Moreover, the maneuver of combat-ready unit sets of 350 people plus equipment is currently not possible without the TSV. The vessel's objective—a fully loaded draft of 15 feet or less—increases by a factor of five the number of ports it can use worldwide. This is important in overcoming enemy port-denial strategies and makes the TSV ideally suited for rapid distribution of goods in humanitarian efforts where road infrastructure can be a major obstacle to reaching remote areas. The TSV also represents an important addition to the mix of joint mobility and deployability systems. Today's rapid deployment of forces relies too heavily on air transport. A logical mix of high-speed water transport can overcome competition for air resources and minimize potential operational limitations.

Reducing cost without reducing readiness. Clearly, the TSV increases warfighting capability from both operational maneuver and sustainment perspectives, but at what relative cost? In support of the TSV's ORD, an operational analysis compared the TSV with legacy Army watercraft and airlift assets. The scenario had watercraft, aircraft, or both moving an SBCT from Okinawa, Japan, to Pusan, Korea. Analysts compared the number of sorties, days required, and costs incurred. In every case, the TSV was a clear winner. Time was reduced by 30 to 92 percent and costs were reduced by 23 to 45 percent.

The Future

The TSV is a truly transformational capability that enhances Army and joint deployment, employment, and sustainment. In anticipation of future production and fielding, the CONOPS for this exciting capability will be further developed during various theater exercises.[5] As a result of jointly sponsored experiments, the Marine Corps now requires a high-speed connector to support expeditionary maneuver warfare doctrine and ship-to-objective maneuver CONOPS. The Navy's Transformational Roadmap for Seabasing also demands high-speed, shallow-draft vessels. Therefore, the Army's management of the TSV is transitioning to the Joint High Speed Vessel Program led by the Navy. This combined approach will foster greater support for the program and is an economy-of-scale for production and sustainment. ***MR***

NOTES

1. BG Huba Wass de Czege and LTC Zbigniew M. Majchrza, "Enabling Operational Maneuver from Strategic Distances," *Military Review* (May-June 2002): 16.
2. Full-spectrum operations include high-frequency, ultra high-frequency, and very high-frequency narrow and wideband satellite communications.
3. U.S. Army Technical Publication 525-3-0.1, *Objective Force Battle Command Concept* (Washington, DC: U.S. Government Printing Office, 31 October 2002).
4. MG Terry E. Juskowiac and Colonel Michael Williams, "Sustaining Expeditionary Forces," *Army Logistician* (September-October 2003).
5. The projected theater exercises include Foal Eagle, Cobra Gold, Talisman Sabre, and Bright Star.

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