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EXPEDITIONARY SHIP-TO-SHORE LOGISTICS: CAN WE GET THERE FROM HERE?

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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Abstract

U.S. power projection and sustainment of forces from the sea is hindered by decreased direct access to shore due to larger sealift ships, creating a major choke point in the logistics conduit. Operational commanders ought to be concerned about the ability to support ground forces from the sea. Ship-to-shore logistics across undeveloped shorelines remains a challenge that many have placed in the "too hard" category, and have neglected to seriously consider in long range operational planning. The Marine Corps has recognized the issue and resurrected the "Sea-based Logistics" (SBL) concept as an alternative to Joint Logistics Over the Shore (JLOTS) for support of Operational Maneuver From The Sea (OMFTS).

There is a viable solution to the amphibious logistics problem, but work is still needed. Both JLOTS and SBL are needed to cover the spectrum of ship-to-shore logistics requirements, because of case specific capabilities in each concept. The two concepts are complementary; not exclusive. JLOTS will continue to be the most efficient and economical method for moving large volumes of cargo to shore from the nearshore area, while the SBL concept offers the responsiveness, flexibility, and agility needed to gain the fullest strength of OMFTS in small combat operations and for over-the-horizon sea basing. However, both concepts need further development to meet the needs of OMFTS. Our Landing Forces may be in trouble if we do not pay attention to further development of amphibious logistics. The U.S. cannot assume that first-class port facilities will be available to logistically support military operations ashore. Failure to maintain an effective ship-to-shore logistics capability for the future will hinder U.S. military reach in power projection "from the sea."

Logistics Choke Point. As the U.S. Navy continues to adapt to the support of land forces in power projection "from the sea," we must give priority to solving the most difficult problem of the expeditionary logistics chain: the delivery of equipment and supplies from ship to shore. Ship to shore logistics across undeveloped shorelines remains a challenge that many have placed in the "too hard" category, and have neglected to seriously consider in long range operational planning. There are several factors emerging out of recent U.S. military operations which ought to cause serious concern to operational commanders planning for sustainment of forces ashore. The increased need to project power and sustainment of forces from the sea is combined with decreased port access due to larger sealift ships, creating a major choke point in the logistics conduit. Development efforts are aimed at reducing the support requirement, but there is still an urgent need to develop expeditionary ship-to-shore logistics. The Marine Corps has resurrected the Sea-based Logistics (SBL) concept as an alternative to the current Joint Logistics Over the Shore (JLOTS). Which one is the right choice for the future?

The Change in Strategy. The reduced overseas presence of U.S. forces creates a greater dependence on power projection from U.S. bases to protect national interests throughout the world. That places a heavy emphasis on the logistics necessary to sustain forces in remote theaters of operations. "Focused logistics will enable joint forces of the future to be more mobile, versatile, and projectable from anywhere in the world."[1] The National Military Strategy recognizes several strategic mobility enhancements necessary to project military power worldwide. These include enhancements in airlift, Maritime Prepositioning Forces (MPF), sealift surge capacity, and the Ready Reserve Force (RRF).[2] Historically, at least 95 percent of

[1] John M. Shalikashvili, Joint Vision 2010, (Washington DC: Department of Defense, 1996), p. 24

[2] John M. Shalikashvili, National Military Strategy of the United States of America, (Washington DC: Department of Defense, February 1995), p. 7.

the logistics needed to support major operations has been transported by sea, with the obvious requirement to be able to deliver supplies to the theater of operations, either through ports or over undeveloped beaches.[3] Therefore, we ought to know how our cargo will get ashore. Operation RESTORE HOPE in Somalia was a clear illustration of the emerging problem. The first three MPF ships to respond could not offload in the port of Mogadishu, because the pier was too short and the harbor too shallow. Basic intelligence could have avoided the situation. One went to Kismayo where the port was hardly better, and two of the three MPF ships returned to Diego Garcia after 14 days without having unloaded their cargo. All three had the ability to offload "in stream," but nobody planned for it.[4] The next U.S. military operation may lead us to a similar situation with no suitable port, or the port may be denied by enemy action. The trend toward greater U.S. involvement in humanitarian assistance and Lesser Regional Contingencies (LRC) will naturally focus on nations with little or no port infrastructure. Compounding the problem is the trend toward larger sealift ships. While the larger ships can transport with greater speed and economy, they become more dependent on developed deep-water ports or the ability to efficiently offload the ships "in stream" and ferry cargo to shore by lighterage. The new Algol T-AKR Class of Fast Sealift Ships (FSS) is the largest of the MPF classes, at 946 feet long with a draft of 37 feet, allowing access to fewer ports.[5] The first of 19 Large Medium-Speed Roll-on/Roll-off (LMSR) ships, entering service in FY97, continues the trend toward larger vessels for strategic sealift.[6]

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[3] U.S. Navy Dept., Military Sealift Command: 1995 In Review. (Washington: Department of the Navy, 1996), p. 16.

[4] Kenneth Allard, Somalia Operations: Lessons Learned. (Washington, DC: National Defense University Press, 1995), p. 50.

[5] Joint Pub 4-01.6, JTTP for Joint Logistics Over The Shore (JLOTS). (Washington DC: The Joint Chiefs of Staff, August 1991), Table C-1, p. C-4.

[6] U.S. Navy Dept., Military Sealift Command: 1995 In Review, p. 23.

A Change in Operations. The U.S. Marine Corps has revised amphibious doctrine from "ship-to-shore movement" to "ship-to-shore maneuver," as reflected in the concept of Operational Maneuver from the Sea (OMFTS).[7] The Marine Corps vision capitalizes on the unique amphibious, expeditionary nature of the Marines to address the potential threats of the future.

This conceptual change demands a new approach to ship-to-shore logistics. The Marine Corps requires greater agility and flexibility to get in, get the job done, and get back out, all without a burdensome logistics tail. "We need to be lighter, more agile, with less footprint to win battles against increasingly well-armed adversaries."[8] The Combat Service Support (CSS) elements need to be as agile and flexible as the combat elements they support. The opportunities for more "focused logistics" present themselves in manufacturing process improvements, inventory management, asset visibility, and a responsive distribution system. In most areas of logistics, a systemic approach is producing remarkable improvements. Amphibious logistics distribution continues to present a major challenge.

Amphibious Logistics in History. From the earliest recorded naval history, dominant maritime nations recognized the foundational requirement for logistics support of forces on land and sea. The Persian King Xerxes utilized sea-based logistics in his third expedition in 480 BC, using hundreds of ships to continuously resupply his troops as they marched along the coast of the Aegean Sea from Sardis to Athens. This early use of SBL was a result of the failed amphibious landing at Marathon ten years earlier rather than an enabler of maneuver warfare, but it

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[7] U.S. Navy Dept., Operational Maneuver From The Sea, (Washington DC: Headquarters U. S. Marine Corps, January 1996), p. 5.

[8] Charles A. Krulak, Precision Logistics, White Letter 01-97 (Washington: Headquarters, U. S. Marine Corps, January 1997)

demonstrated the flexibility and mobility desired in modern expeditionary operations.[9]

A precursor to the modern JLOTS was the innovative causeway system used during the invasion of Normandy in World War II. Operation MULBERRY constructed two artificial harbors along the beaches of Normandy by sinking old merchant ships, concrete caissons, and steel floats offshore to form artificial breakwaters. Floating steel causeways were extended from the shoreline to pontoon piers in deeper water where small cargo ships could unload. On 7 June 1944, components of Mulberry "A" arrived at Omaha Beach and Mulberry "B" arrived at Gold Beach in the British sector. Both began offloading ships on 17 June. On 19 June, a severe storm destroyed Mulberry "A", but left Mulberry "B" functional. With sustainment of the landing forces in jeopardy, LST's beached themselves shortly after high tide, offloaded directly to the beach, and refloated when the tide came back in. While this method had its own risks, the rate of offload increased from the limited throughput of the causeways.[10]

In 1970, President Nixon declared his foreign policy, known as the Nixon Doctrine, which called for the reduction of overseas presence, while maintaining the ability to project U.S. military power to protect vital national interests.[11] The Nixon Doctrine was the spark that ignited the fires of innovation, and began the first serious investigation of sea-based amphibious forces. The concepts which came out of the amphibious warfare initiatives remain virtually unchanged from their publication in 1972. Today, the military is being shaped by a similar policy, and we again have the opportunity for innovation.

Current Doctrine. The elimination of a significant deep-water threat has returned

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[9] E. B. Potter and Chester Nimitz, Sea Power (Englewood Cliffs, NJ: Prentice-Hall, 1960), p. 6.

[10] Ibid., p. 617-618.

[11] U.S. Navy Dept., SMLS: Seaborne Mobile Logistics System. (Washington: Department of the Navy, 1972), p.3.

the U.S. focus to power projection from the sea, and supporting land forces in regional conflicts. Current joint amphibious doctrine divides the ship-to-shore movement into two phases: (1) The assault and initial unloading period, which is primarily tactical and must provide quick response to Landing Force requirements ashore; and (2) The general unloading period, which is primarily logistics oriented and emphasizes rapid completion of the unloading of personnel and material remaining in assault shipping.[12] The first phase corresponds with the Assault Echelon (AE) and Combat Support (CS) functions, while the second phase corresponds with the Assault Follow-On Echelon (AFOE) and Combat Service Support (CSS) functions. Methods of ship-to-shore movement have continued to evolve as new equipment and techniques are developed. The current process supports the Assault Echelon through the initial amphibious landings and establishment of a secure beachhead. The AFOE supports the general offload of cargo in the "build-up" phase. Once the build-up reaches a critical level of supplies and equipment, then the Landing Force can conduct "subsequent operations ashore" in order to achieve the military objective.

Joint Logistics Over the Shore: Just In Case

The transition from the AE to the AFOE marks the point where Joint Logistics Over the Shore (JLOTS) takes over the ship to shore movement. JLOTS is an assembly of components linking ships at sea with vehicles ashore. These are easily recognizable as ancestors of the World War II Mulberries. Various generations of the same process have resulted from improvements in deployability, safety, assembly methods, and adaptability to a variety of beach configurations, but the basic building blocks of the system are still there. Much of the evolution of JLOTS is the result of the transition in commercial shipping from breakbulk cargo to shipping containers

[12] Joint Pub 3-02. Joint Doctrine for Amphibious Operations (Washington DC: The Joint Chiefs of Staff, October 1992), p. IX-1.

beginning in the early 1950s.[13] The shipping container brought several advantages including the security of the cargo, rapid transfer between modes of transportation, and the ability to optimize cargo holds and deck space. However, a disadvantage in amphibious logistics is that large containers are difficult to move ashore without the benefit of a modern port facility. The purpose of JLOTS is to create temporary infrastructure on an unimproved beach which will support the sustained transfer of cargo from sealift ships to the shore, where it will be further distributed to the requiring combat units. The capabilities of the JLOTS operation are significant to operational logistics planners, but it is equally important to recognize JLOTS limitations.

Using lighterage such as landing craft, amphibious vehicles, air cushion vehicles, and barge ferries, the JLOTS operation is designed for in-stream offload of MPF ships and transfer of the cargo to shore. JLOTS provides the infrastructure necessary to bridge natural obstacles, including the surf zone, sand bars with deep interstitial waters, or long shallow beach approaches. The Elevated Causeway System (ELCAS) is a temporary bridging structure which can extend as much as 3,000 feet from the shoreline to reach a water depth of 20 feet, where barge ferries and other watercraft can come alongside. Modular floating causeway sections can be assembled into a floating causeway pier, extending from the beach to a depth accessible by small watercraft. The same type of causeway sections can be assembled as a Roll-on/Roll-off (RORO) ship Discharge Facility (RRDF), where a RORO ship can lower its ramp and discharge rolling stock onto a floating platform for further transfer to lighterage. The causeway sections form the backbone of the cargo offload when assembled as the barge ferry system with a powered causeway section, usually two unpowered sections attached to the front of a powered section (referred to

[13] Dan J. Beakey, Logistics Over The Shore: Do We Need It?, (Washington, DC: National Defense University Press, 1982), p. 6.

as a "2+1" configuration).

JLOTS also includes the Amphibious Assault Bulk Fuel System (AABFS) and the Offshore Petroleum Discharge System (OPDS). The AABFS can transfer up to 700,000 gallons of fuel per day from ship to shore, and can be installed in eight hours. The OPDS can transfer up to 1.2 million gallons of fuel per day from ship to shore, and is a more durable system for long-term installation.

The JLOTS equipment is able to adapt to a wide variety of shorelines, but is not suitable for rocky shorelines or severe beach slopes. JLOTS requires a beach gradient which is (a) accessible to main supply routes, (b) accessible for lighterage and suitable for ELCAS installation, (c) suitable for beach crossing roads and beach hard stands.[14]

OCEAN VENTURE 93 (OV93) tested the throughput capacity of JLOTS operations by offloading two container ships and two RORO ships at Camp Lejeune, North Carolina. The JLOTS exercise offloaded 802 containers and 1,371 vehicles in fourteen days. Including shore preparations, the whole exercise took 34 days. To put the level of effort in perspective, the OV93 JLOTS exercise included seven strategic sealift vessels, 62 military units totaling more than 5,000 military and civilian personnel, 71 watercraft, installation of an 810-foot ELCAS, three floating piers, several miles of graded roadway, two marshaling yards, and unit bivouac sites.[15]

For several reasons, the exercise yielded throughput rates well below the doctrinal levels. Sea state and weather were significant factors. Operations came to a near standstill in high sea state 2, and were shut down completely in sea state 3. Nevertheless, OV93 demonstrated that JLOTS is able to deliver large volumes of cargo from ship to shore and sustain long term amphibious resupply in support of major military operations. The OV93 offload would be comparable to the offload of

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[14] Joint Pub 4-01.6, p. IV-19.

[15] U.S. Dept of Defense. JLOTS III Technical Report, Vol I (Washington, DC: Department of Defense, May 1994), p. 1-3.

one MPS Squadron of four ships. One MPS Squadron supports one Marine Expeditionary Brigade (MEB) of 17,300 Marines for 30 days.[16] The MPF ships are combat loaded, theoretically allowing the discharge of cargo in the general order of need by combat units.

Sea-Based Logistics: Just in Time. Sea-based logistics (SBL) is the logistics sustainment of Landing Force elements directly from task force ships at sea. All C2 and CSS functions remain at sea. The concept includes repair of equipment casualties by "contact teams," maintenance shops at sea, and equipment rotation for maintenance and repair.[17] The SBL concept virtually eliminates the build-up phase of amphibious operations, allowing combat forces to maneuver immediately from the sea toward inland objectives without first securing a beachhead.

The reduction or elimination of a beachhead offers significant advantages. First, SBL ensures that the response of the amphibious force in the littorals is "independent of forward staging bases, friendly borders, overflight rights, and other politically dependent support."[18] Second, consistent with the need to maximize force agility, SBL would free the Landing Force from the tether of shore-based support and the need to secure lines of communication ashore. Third, SBL allows combat troops to remain focused on mission objectives, rather than having to defend critical shore-based logistics nodes. "The reduced logistics footprint of landing forces armed with more precise weapons will also translate into a significant reduction in the time needed for ship-to-objective and shore-to-ship maneuver."[19]

SBL shifts the focus from "just-in-case" inventory-based logistics to "just-in-time" transportation-based logistics. While the commercial sector is trading costly

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16 Military Sealift Command, 1995 In Review. (Washington: Department of the Navy, 1996), p. 17.

17 U.S. Navy Dept., SMLS: Seaborne Mobile Logistics System, p. 9.

18 U.S. Navy Dept., Operational Maneuver From The Sea, p. 2.

19 Ibid., p. 4.

inventory for cheaper transportation, the military is trading vulnerable inventory ashore for the flexibility of SBL from relatively secure offshore supply vessels. Recent emphasis has focused on applying the highly successful business practice of just-in-time logistics to meet military logistics requirements, making use of a versatile network of commercial and military transportation systems. The principle of just-in-time logistics is a proven concept to increase responsiveness, reduce logistics infrastructure, and decrease the logistics footprint. While this logistics concept will continue to produce revolutionary improvements in the benign environment of peacetime logistics, it has some limitations that must be considered in planning sustainment of forces from the sea.

Just-in-time logistics demands a predictable requirement at a predictable time, and a reliable delivery method. The difference between the marketplace and the battlefield is readily apparent when we consider the consequences of failure. In the commercial sector, if a part fails to be delivered by "10 AM on the next business day," it might slow the production line, or delay a meeting. In the combat environment, failure means loss of life. The military logistics chain is fairly predictable up to the point where the chain links the ship to shore, and enters the fog of war.

Several ideas are being examined for reliable transportation to support SBL. In 1972, the options depended on helicopters or air drops. Today, the Marines are looking toward the MV-22 to replace aging helicopters, and add to the agility of the amphibious force. The landing craft, air cushion (LCAC) can provide rapid, heavy lift transport to the shore, and has been used in recent exercises for support of ship-to-shore logistics. Other innovations are being investigated in such places as the Marine Commandant's Warfighting Laboratory, where the "Hunter Warrior" initiatives are investigating such ideas as Unmanned Aerial Vehicles (UAV), or gliders with GPS or laser guidance to deliver urgently needed supplies.

For transporting very small, isolated loads ashore, the LCAC or helicopter in SBL is the best choice for fast and economical delivery. However, in support of larger operations, such as MPF offloads, the use of low capacity, high-speed transports gains very little advantage. For offloading one MPS squadron in support of a MEB, the use of LCACs may reduce the offload time to approximately six days from the seven days required for conventional lighterage. However, that one day of saved time comes at a very high price. The cost of operating an LCAC is approximately $2,800 per hour, while the cost of operating a barge ferry is approximately $50 per hour. For an MPS offload, the cost would be $1,008,000 for LCACs as compared with $56,600 for barge ferries.[20] A loaded LCAC can travel in excess of 40 knots, but can carry only three containers or seven vehicles. A loaded barge ferry in the "2+1" configuration can travel at only 7 knots, but can carry 21 containers or 28 vehicles.[21] For small requirements, the LCAC has a clear advantage in responsiveness, but larger requirements can be best handled using conventional methods. SBL yields significantly reduced offload times for over-the-horizon operations. Helicopters and the MV-22 have no capability for heavy lift or outsized cargo, but are essential in either the JLOTS or SBL scenarios for rapid replenishment of inland locations. Regardless of the method chosen, assets committed to logistics support are not available for combat support. The operational commander must be aware that expediency comes at a cost, which may be well worth the price for agility in small operations, but would be hard to justify for a major offload or non-combat operations.

The concerns about SBL today are identical to those presented in 1972. Air delivery is vulnerable to unsophisticated weapons and dependent on weather.[22] Airlift

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20 Center for Naval Analyses. LCAC in Support to Sealift Missions: Task 1 Results. CRM 96-18. (Alexandria, VA: June 1996), p. 13.

21 Joint Pub 4-01.6, Table B-1.

22 Ezra H. Arkland, The Mobile Sea-Based Amphibious Force and the Nixon Doctrine. (Carlisle Barracks, PA: Army War College, 1972), p. 19.

limits SBL sustainment to small operations. Since small units may only carry supplies for one day at a time, a forward logistics base or cache may still be necessary to allow for bad weather when aircraft cannot fly. Additionally, MPF ships would have to be reconfigured to support access to specific cargo. The flood of containerized cargo to shore would be replaced by delivery of just the required items when needed. While there are still a few serious limitations, technology changes may soon allow SBL to mature into the agile, flexible logistics capability needed to support OMFTS.

Principles of Ship-to-Shore Logistics

The ship-to-shore logistics system of the future will need to closely match the operating principles of OMFTS. When JLOTS and SBL are weighed against sound principles of support to the operational commander, then the priorities for needed change are highlighted by the ability to sustain the Landing Force. Ship-to-shore logistics, as with CSS of any kind, must be responsive, reliable, sufficient, flexible, agile, secure, and feasible.

Responsive. SBL is much more responsive than JLOTS for small operations. SBL is capable of providing an initial response with logistics and transportation assets deployed with the Amphibious Ready Group (ARG), and may be augmented with MPF assets as needed. Current operations involving units no larger than a MEU already use the SBL concept to sustain amphibious landing forces for operations lasting less than the 30 day self-sustaining capability. For small unit operations, incremental replenishment of supplies at sea may be practical for short periods of time, but would be difficult to maintain for protracted engagements requiring more robust logistics support. If MPS mobilization is necessary, then JLOTS would be needed to support most offload requirements using the current MPS

ship configurations. While MPS mobilization time is the same for either SBL or JLOTS, there is potential for improving responsiveness of both SBL and JLOTS by modifying MPS ship load plans to provide access to specific cargo at sea and preclude the requirement for general offload.

Reliable. One of the arguments for maintaining a shore logistics base is that supplies ashore can be delivered to the Landing Force without the uncertainties of weather and sea state which would accompany SBL. This may be valid for ground operations close to the BSA, but Landing Force operations would need to remain within a supportable distance while protecting land lines of communication. As ground operations extend further from the BSA in the course of operational maneuver, then SBL provides a more reliable means of delivery, since logistic support from a BSA would risk overextending protected lines of logistics.

Adequate. If a logistics system cannot supply enough of the right items to the combat units, then the system is no good. JLOTS maintains assets dedicated to ship-to-shore logistics which are capable of sustaining a large cargo throughput for extended periods. SBL is capable of expeditionary support, limited by lift capacity and availability of high-speed platforms for logistics support. SBL cannot support bulk fuel and water requirements. A small throughput capacity may be adequate for raider operations, but SBL would be quickly stressed in larger operations.

Flexible. Operational logistics must maintain the operational commander's options by minimizing logistics constraints. Operational logistics must allow the operational commander to exploit opportunities, and to respond quickly and effectively to developments during the course of an operation. SBL allows the commander to maneuver forces and redirect logistics support nearly simultaneously. There is no logistics tether to a BSA, and no waiting for a build-up phase ashore. Where SBL has the capability to reach combat forces with sufficient lift, it is

unmatched for logistical flexibility. JLOTS maintains flexibility at the strategic level in that it can be employed in almost any coastal area, but once established, JLOTS limits operational flexibility.

Agile. The SBL concept is founded on agility. SBL can adapt easily to operational requirements. JLOTS can maintain limited agility if the ELCAS and OPDS are not established. A BSA can be abandoned in favor of an alternative site. However, relocation may involve securing a new beachhead for restoring JLOTS operations, where SBL would not require a shore base. A reduced JLOTS footprint is required to enhance agility for larger operations.

Secure. One of the vulnerabilities of JLOTS is the risk of enemy attack on a shore-based logistics node. A BSA requires self-defense. Loss of the BSA in JLOTS threatens the viability of the entire operation. In the case of SBL, the loss of one transport may reduce the logistics capacity, but does not threaten the security of the entire Landing Force. SBL is not without its security risks, however. Logistics support at sea faces the threat of attack by enemy air, surface, or subsurface forces, although the existence of forces capable of such attacks has lessened since the end of the Cold War, and most regional contingency operations face nations without a significant naval threat.

Feasible. JLOTS and SBL are both feasible, since they are already in use in some form. Future feasibility concerns the technical improvements and associated cost necessary meet the operational needs of OMFTS. As demonstrated throughout the history of JLOTS and its predecessors, technical and procedural development has been evolutionary. There are clear opportunities for JLOTS to further adapt to the demands of OMFTS. SBL, on the other hand, has failed to develop much beyond the conceptual phase, primarily due to the cost of the systems needed to support it. Continued research and innovation has the potential to yield more cost effective

means of delivery with all the speed and flexibility required of the SBL concept. Though technically feasible with vehicles such as the LCAC and MV-22, the cost currently precludes the use of SBL for peacetime operations or large-scale contingencies.

Conclusion

There are viable solutions to the amphibious logistics problem, but work is still needed. Both JLOTS and SBL are needed to cover the spectrum of ship-to-shore logistics requirements. The two concepts are complementary; not exclusive. JLOTS will continue to be the most efficient and economical method for moving large volumes of cargo to shore from the nearshore area, while the SBL concept offers the responsiveness, flexibility, and agility needed to gain the fullest strength of OMFTS in small combat operations and for over-the-horizon sea basing.

JLOTS must develop greater responsiveness, flexibility, and agility in order to support OMFTS. Alternative methods of ship loading should be examined to preclude the need for general offload, and we must reduce the logistics requirement in the Landing Force. Proficiency in JLOTS must be maintained through frequent exercises. For the moment, there is no alternative. Therefore, JLOTS represents a critical capability.

SBL is ideal for supporting small operations. The concept needs more research into affordable delivery methods with adequate capacity. Aircraft or LCACs are too expensive to dedicate the required number for logistics missions. However, even with high cost and limited capacity, the speed and agility of SBL may make it the best choice for operations such as amphibious raids or special operations.

Neither JLOTS or SBL can do it all, but they can offer some options for the operational commander. Our Landing Forces may be in trouble if we do not pay

attention to further development of amphibious logistics. The U.S. cannot assume that first-class port facilities will be available to logistically support military operations ashore. Failure to maintain an effective ship-to-shore logistics capability for the future will hinder U.S. military reach in power projection "from the sea."

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