Is Sea-Basing a Viable Method of Providing Logistic Support to the UK Amphibious Force ?

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Maritime power has traditionally been a central part of the UK's defence planning and is well suited to supporting a wide range of military operations. The littoral area has always created problems for naval planners as most landings historically have had to endure a tactical separation of the naval and land components, and hence an artificial seam between the Navy and the Marines. With the end of the Cold War, amphibious operations are going to be more difficult to conduct than in the past, and amphibious forces are going to have to adopt manoeuvre warfare capabilities in order to successfully complete their missions. It is very likely that amphibious forces will have to conduct operations against a numerically superior enemy, who is on his own terrain, and be surrounded by a neutral, if not hostile populace. As such, the concept of Operational Manoeuvre From The Sea (OMFTS) whereby the sea is used as a manoeuvre space, and command and control is fast enough to cope with large amounts of information, but at the same time allow subordinates maximum flexibility to use their initiative, is increasingly attractive. It will be important not only for the combat elements to be able to use this new concept, but the Combat Service Support (CSS) elements as well.

The Amphibious Environment

An organization's strategies must be matched to the environment within which it operates. It is therefore important to asses the impact of the changing political and defence environments

on the UK amphibious landing force and how it operates. Environmental factors that are likely to influence present and future operations include the lack of a deep water global naval threat; a multi-polar world; the increase in ethnic, religious and tribal conflict; the rise of non-state actors; the increase in media attention given to foreign military operations; the growing importance of military casualties as regards media coverage; the increase in high technology weapon sales, especially by China, North Korea and Russia; the continued decline in defence spending but growing interest in intervention and expeditionary capabilities and the increase in the accuracy and lethality of commercially available weapon systems.

The scenario that can be constructed from this confirms that amphibious operations need to move out of the inshore area to deeper water, thus escaping the increased threats around the beach. The structural attractiveness of this scenario is self evident: the sea provides a barrier from the enemy, or potential enemy, whilst allowing for manoeuvre space and this view is consistent with the OMFTS doctrine.

The identified sources of competitive advantage all point towards logistics. They demonstrate that the logistics must be sea-based if the competitive advantages of OMFTS are to be realised, however, this goes against the current military logistics paradigm, which emphasises the considerable friction present in military operations. Ignoring it could lead to the adoption of a strategy that is not robust enough to cope with the demands of combat.

The Amphibious Logistics Supply Chain

Despite the occasional sharp reminder of its importance, the understanding of logistics in the Armed Forces is not widespread. In practice, there is scant evidence that proper preparation for war has been attempted by the majority of twentieth-century operational planners and little thought has been given to the ideal combination of assets which, in theory would enhanced their logistic support capability.

Yet much has been written to suggest that logistics can provide a source of competitive advantage and value, reduce costs and offer improved service levels. The current system is as follows. When an order to undertake an amphibious operation has been given, the MOD will outload the relevant War Reserve Schedules (WRS) needed to conduct the operation (fuel, ammunition, vehicles etc.). These items (that are stored around the country in various depots) are taken to the port of embarkation and loaded onto specialist military shipping, or a civilian ship requisitioned for the task (known as a Ship Taken Up From the Trade - STUFT). When the area of the operation is reached, the ships will be positioned as close to the beach as possible (allowing for factors such as weather, tidal conditions, enemy presence etc.) and the combat elements off-load first. The logistic support elements will then be off-loaded (Commando Logistic Regiment Royal Marines) into a Beach Support Area (BSA), as will whatever parts of the WRS are needed to support the operational plan. The ships will then withdraw, and the operation will become land based. The command and control arrangements are suitably complex. The Landing Force Support Party (LFSP) is at the hub, and facilitates the movement of troops, equipment and supplies through the landing zones, and assists in evacuating casualties, refugees and POWs. The landing force will also need to communicate with the Commander of the Amphibious Task Force (CATF) and the Assault Supply Party (ASP) on each ship (which keeps track of the inventory and stowage position for their vessel).

The requirements of sea based logistics are founded on the premise that demands for CSS will greatly increase and the CSS must be structured to operate in a shipboard environment with little or no footprint ashore. CSS must be provided to the consumer on-site, as must the replacement of unserviceable equipment, with repair carried out onboard ship, if necessary. Large inventories of stock will no longer be possible in limited cargo ship space. The sea-based logistics system must overcome the time, distance and volume factors and provide responsive CSS in a seamless manner. It must have the capability to support forces almost entirely from a sea base. Moreover it must be flexible to the extent that the sea base can operate from near shore or at distances well over the horizon, whilst still delivering timely and reliable CSS. The system must be designed to optimise the capabilities of the operational assets as well as provide the support and sustainment that is necessary.

Sea Base

A functional sea base with embarked logistic personnel, material and equipment is a critical element in supporting and sustaining the manoeuvre force during OMFTS. The capabilities that such a base would require are:

- The capability to access and offload any embarked item without delay.
- Perform the standard CSS functions from afloat or move them ashore.
- Rapidly discharge or embark all supplies, equipment, personnel and facilities.
- Store all classes of supply to support an assault and the follow on force.
- Operate with all ship-to-shore transfer systems.

Total Asset Visibility (TAV)

To have a true selective offloading capability and a responsive supply system, total visibility of all assets is required. This means an autonomous system that maintains accurate, real time data on commodity identification, quantity and location: in short a system that provides TAV and should have the following levels of visibility:

- In the Box Visibility. Asset information must be autonomously updated as items enter or leave a container. The data must be transmitted to a main database quickly and accurately.
- In-Facility Visibility. Items within a facility, such as a depot, a ship or in the BSA, must be tracked so that their location within the facility is known.
- Wide Area Tracking. Wide area tracking should allow for the tracking of assets within the amphibious objective area.
- In-Transit Visibility. In transit visibility would allow for any item to be tracked whilst moving from one location to another and that information translated into a meaningful time/distance form to both customers and suppliers.

Material Distribution System

Whilst the sea base would provide the storage and accessibility of sustainment assets, it must be supplemented by a reliable material distribution system. The system must be dedicated to distributing equipment from the sea base forward to the landing force.

Landing Zone

The OMFTS philosophy of ship to objective manoeuvre means avoiding the large build up of supplies ashore. Cargo must be delivered to support areas in proximity to the manoeuvre forces. There will be a requirement for an Landing Zone Support Area (LZSA) close to the manoeuvre elements, but it must have considerably less footprint than is currently the case. It will need to be an area where equipment, facilities and personnel are available to receive packaged supplies, material, fuel and water from the sea base. An important feature of these LZSAs will be the capability to build up or disperse hardware in hours rather than days.

Command and Control Requirements

The importance of command and control in logistics organizations is well recognised. This is even more important in an environment where the hard division between sea and land forms a barrier to many forms of communication. The essential elements can best be captured by stating the requirements of a CSS Commander:

- Situational Awareness. The logistics commander will require awareness of the tactical situation, for both friendly and enemy forces, to the same standard as the operational commander.
- Common Logistics Picture. They will require access to a logistics picture from "factory to foxhole".
- Maximum Automation. Logistics requests, reports and returns must be automated whenever possible.
- Devolved Execution. Whilst all the above demands centralised control, the requirement for decentralised execution is not invalidated, since the volume of logistics orders is likely to overwhelm even the most sophisticated of systems.

Inventory and Warehousing

There is a complicated supply chain to get the WRS from the depots onto the shipping and once they are there, the schedules will not necessarily be complete. A database of what has been embarked will not be available until the ASP have constructed it, provided they are able to. Nor is there any link in the supply chain from industry to the task force. Items that have to come from industry will be ordered by the depot, for delivery there and subsequent transportation to the task force. Thus there is a requirement to directly link the task force and industry. The process also assumes that the traditional amphibious operations paradigm of Plan, Embark, Rehearse, Move and Assault (PERMA) will be followed, in order that the right WRS are loaded. Yet OMFTS demands EMPRA (Embark, Move, Plan, Rehearse and Assault). The current system is flawed, in that not only is there no clear picture of what has been embarked, there may be no method of establishing it. Thus it is clear that loading WRS onto STUFT does not meet the requirement and what is needed are stores ships capable of managing the inventory. An additional element to be considered is how to reduce the tare weight of supplies, and what scope there is to reduce demand in all classes of supply, in order to lighten the burden placed on the supply chain.

Transport

A number of weaknesses in the transport system can be identified. Firstly there is the difficulty of movement ashore. Traditional methods of movement ashore are either helicopter, landing craft, or mexefloat. The current generation of helicopters are severely restricted in their load carrying capacity and cannot readily contribute to volume offload. The landing craft

and the mexefloat are both slow and whilst this is acceptable for short transit distances, at the distances demanded by OMFTS, transit times become unrealistic.

For STUFT there is the requirement to erect a ramp support pontoon under the stern gate of Ro-Ro ships to offload vehicles: a tedious and time consuming manoeuvre. Furthermore there is a sea state three limitation on ships without a dock to facilitate unloading in rough seas. To this must be added the demands of beach preparation and cargo handling.

Current land transport methods do not meet the needs of OMFTS. There is a need to enhance the transfer capability for an increased stand-off distance. This translates into greater efficiency in stowage, strike-up and a high capacity delivery system.

Fuel

Current methods of fuel distribution and storage are incompatible with the OMFTS concept. There is a need to transfer fuel from ship to shore at distances that preclude bottom laid hoses. Providing accurate methods of monitoring fuel consumption and delivering the fuel only when required, will greatly reduce the demand. Complementary to achieving this objective would be methods of reducing fuel consumption.

Vehicle Maintenance

The current vehicle maintenance system will be over-faced by the demands of OMFTS. Vehicles take too long to repair, command and control of maintenance operations is fragmented and local. The size of the Main Repair Group goes against the principle of

minimum footprint ashore and the forward repair policy means highly trained artificers are sent into high risk areas.

OMFTS requires the development of a central system capable of handling all maintenance operations and requests. The thrust of this philosophy will be:

- To reduce maintenance requirements.
- To introduce self diagnosis and built-in maintenance alert indicators, that allow remote monitoring of vehicle status.
- To develop a tagging system that monitors the location of a vehicle.
- By intelligent and detailed remote monitoring and maintenance, reduce the requirement for major shore facilities.

Current Command and Control

The current logistic command and control arrangements do not provide the sort of information required, either in the detail, or in the timeframe that OMFTS requires. More capacity, access and functionality will be required than ever before. This means the development of a tactical CSS command and control system which includes near real time situational awareness and TAV of CSS resources.

Key Issues

The whole area of information management is crucial. It is inextricably linked to command and control and even if the sea based concept were to prove invalid, the requirement to manage information, rather than inventory would remain relevant.

The most important aspect of logistics information management concerns visibility of demand. The conditions of demand growth and contraction lead to distortion when there is no clear picture of what the demand truly is. It is therefore important to create an information system that allows for visibility of demand, in as near real time as possible.

Ammunition has emerged as the great consumer of logistic effort and resources. Whilst some efforts might be made to reduce tare weight, this would not make a significant difference to the enormity of the task and some other method of providing the end effects must be sought.

Similarly, military vehicles remain firmly dependent on fossil fuels. The footprint for fuel storage is large, highly vulnerable to disruption by the enemy and not readily moved. This represents the single largest distribution challenge to the whole concept. Some method must therefore be found of either effective fuel distribution, or of drastically reducing the demand.

A Sea-Based Logistics Strategy

Sea-based logistics must provide the functions of CSS from the sea. The focus of effort must be on distribution, not transportation, and footprint and inventory must be reduced. Logistic support must be oriented to the military effort and CSS must be synchronised to the demands of OMFTS. There must be economy of effort at all stages, in order to sustain the force for as

long as required, not just until supplies are exhausted. The end state reached must be dependable and responsive CSS that takes advantage of new skills and structure, leading to world class expeditionary logistics.

Purely by introducing new technology to the problem (that is, automation), need not necessarily produce a more efficient system. A system centred around the information is more likely, the way to procede. In order to achieve the strategic objectives, a fundamental change to the command and control arrangements is essential. This would involve creating a headquarters that integrated the current functions of the brigade logistics staff along with those of the logistic regiment's headquarters, where their function would be the management of the supply chain and its information flows.

A crucial element in realising demand visibility, is knowing where orders are in the supply chain and this requires an asset tracking system, some elements of which are already in place. However, there is a need for all elements of the supply chain to be linked so that an item can be found at any time during its journey. The most challenging part of this is the provision of this information once the items have reached the shore. However, the technology to construct a suitable satellite based secure communications link already exists.

A sea base from which to support operations is essential. This base would be the centre for the reception of outloaded WRS, their stowage during transit and their platform for rapid retrieval, preparation and delivery. The Fort Class Auxiliary ships could at least partly fill this role today: they lack only the ability to interface with surface delivery assets, particularly above sea state three. This could be achieved by the addition of a stem dock, built into the requirement of their eventual replacements.

An effective distribution system is also required and innovative technology has already provided many of the solutions to this particular problem. These include the Guided Parafoil Air Delivery System, the GKN Defence Aquatrack, the Landing Craft Air Cushion and the Skyhook Multiple Point Delivery System. Whilst the V22 Osprey would be capable of precision delivery, the development costs alone make acquisition of this aircraft impractical for the UK amphibious landing force.

In order to eliminate the logistic burden of shore based maintenance of vehicles, a system of remote vehicle maintenance must be established. This can be achieved by the installation of sensors with transponder links to the CSS headquarters. This would allow mechanics afloat to monitor the location and status of vehicles ashore and despatch the relevant parts and if required, a repair team fully equipped to deal with the problem.

Overall Conclusions

For OMFTS to be a viable strategy, a sea based logistics strategy must accompany it, as must the means to deliver it. Central to this is the provision of an information system that allows the logisticians to fully support the operational commander's intent and they can only do this if they have a real time appreciation of the demand, provided by total visibility of the supply chain. The provision of an appropriate information system, is therefore more important that any other aspect and without it, delivery systems, reductions in demand and any other initiatives become academic.

The information system must allow the operators at the front to make demands directly, without filters or barriers and these must be actioned as quickly as the operational priorities dictate. Of even greater importance is that the operators must know when they will be met, in order to allow proper planning. This will require the command and control of logistic operations to be centralised and possibly sea based.

Whilst there are a number of equally important facets to the sea based logistics strategy, all of which must be implemented for the system to function correctly, the information system aspects stand alone as worthy of implementation, even if all others do not emerge as mature solutions. Thus even if the current distribution system were to be maintained or become inevitable because the operational demands forced it, the requirement for logistic operations to be commanded and controlled from a position of strength, based on real time information is not negated. This part of the strategy therefore remains worthy of implementation regardless of other considerations.

A properly constructed sea base for logistics will be required to support this strategy. Loading stores into STUFT will not suffice and stores ships designed not only to store WRS but also to facilitate their rapid offload and interface with the appropriate delivery systems will be a requirement. Technology has already provided some appropriate methods of delivery and advantage must be taken of these.

No delivery system, regardless of it capacity or speed, can be expected to provide a perfect solution. Demand can always outstrip supply, especially in war. There is therefore a requirement to reduce the logistic demand by decreasing tare weight, increasing fuel economy and leveraging leading edge technology to provide maintenance remotely.

Two important issues remain unresolved: the provision of appropriate fire support and the reliable and continuous supply of fuel. Whilst the bulk of organic fire support for 3 Commando Brigade RM is provided by land based artillery, there will be a requirement for a large footprint, shore based logistics organization. Even if all commodities other than artillery ammunition were sea based, a significant proportion of the logistic effort would have to be ashore.

This issue can only be resolved by the provision of fire support from the sea, where the arsenal ship concept is a possible option. The supply of fuel is linked to the fire support issue. If there is no requirement for a large shore based logistics organization, the demands for fuel are reduced, such that they can be met by the use of dracones and Air Portable Fuel Containers. However, if demand is high, then a shore based fuel farm is inevitable.

Finally the effects of friction cannot be ignored. Historically, nations have based their logistics planning for war on inventory and gross excess in supply, for very good reasons. Friction can debilitate even the most sophisticated of systems and failure of communications, compromises of security and the effects of environmental extremes must all be planned for. The system that is developed must have redundancy to cope with the unexpected. When all else fails, there must be the ability to fall back on the driver, with a truck, load and map, getting through, no matter what. Thus sea basing is a viable method of providing logistic support to the UK amphibious landing force, but not without considerable investment and a willingness to accept change.

Bibliography

Allen, M and Masters, J. 'The Application of Expert Systems Technology to the Operation of a Large Scale Military Logistics Information System', *Journal of Business Logistics*, Vol. 9, No. 2, pp. 103-116.

Aitken, H, Manufacturing Director, Sun Microsystems. 'Mapping and Simplyfing Production Processes, as an Eitabler in the Development and Execution of an Integrated IT Architecture', *Proceedings of a Conference on Optimising Information Flows to Enhance Demand Chain Visibility*, London, 12/13 January 1998.

Bartlett, M, Col. *Assault from the Sea,* Airlife Publishing, 1983.

Bower, J, Lt Col US Marine Ccorps. *CSS Enterprise (Replacing Mass with Information and Speed),* Presentation to Author, 7 February 1997.

Boorda, J M, Adm United States Navy. 'The Navy-Marine Corps Team: Looking Ahead', *Marine Corps Gazette*, March 1995, pp. 22-25.

Bucklow, I, Maj Royal Signals. *A Study to Investigate Feasibility of 3 Commatido Brigade Logistic Resources during Amphibious Operations,* MSc Project Dissertation, Royal Military College of Science, Shrivenham, 1993.

Burns, B and New, S. *Strategic Advantage and Supply Chain Management,* Manchester

School of Management, undated.

Checkland, P. *Systems Thinking, Systems Practise,* 1981.

Christopher, M. *Logistics and Siipply Chain Allaiagement,* Pitman, 1992.

Clapp, M and Southby-Tailyour, E. *Amphibious Assault Falklands,* Leo Cooper, 1996.

Commandant's Warfighting Laboratory. *Draft Paper: SEA DRAGON,* USMC, undated.

Commandant's Warfighting Laboratory. *Fact Sheet, V-22 OSPREY,* USMC, 2 November 1996.

Coopers & Lybrand, *A Study of the Armed Services Logistics Business Process,* Unpublished report to the MOD, 1995.

Creveld, M V. *Supplying War,* Cambridge University Press, 1977.

Directorate of Naval Staff Duties, *The Fundamentals of British Maritime Doctrine,* HMSO, 1995.

Department of Trade and Industry. *Best Practice: Benchmarking,* HMSO, 1992.

Department of Trade and Industry. *Logistics and Supply Chain Management,* HMSO, 1995.

Foxton, P. *Powering War,* Brassey's, 1994.

Gattorna, J. *The Gower Handbook Of Logistics And Distribution Management*, Gower, 4th Ed, 1994.

Hamilton, C, Capt United States Navy. 'Arsenal Ship', *Proceedings of the International Maritime Defence Conference*, Greenwich 7 October 1997, pp. 143-150.

Heard W, Capt US Marine Corps. *CSS Command and Control Efforts within 1st FSSG,* Brief to the Author, 7 February 1997.

Hobson, C W P, Maj Royal Marines. *Landing Support Operations - TD Note,* Unpublished HQ 3 Cdo Bde RM Report, 18 September 1996.

Hobson, C W P, Maj Royal Marines. *Amphibious Logistics - A DCOS Perspective,* HQ 3 Cdo Bde RM, July 1997.

Headquarters Royal Marines and Maritime Warfare Centre, *The United Kingdom Approach to Amphibious Operations,* HMSO, 1997.

Jackson, P. *Jane's All the World's Aircraft 1995-96,* Jane's Information Group, 1995.

Jeffcoat, S, Cdr Royal Navy. *Effectiveness Through People - An Analysis qf a Warship as a Strategic Business Unit,* MDA Dissertation, Cranfield University, 1997.

Johnson, G and Scholes, K. *Exploring Corporate Strategy,* Prentice Hall, 3rd Ed, 1993.

Johnson, G W, Maj US Marine Corps, *Sea Based Logistics Research at the Marine Corps Command and Development Center,* Presentation to the Author, February 1996.

Langstone, M J, *C4I in Joint Littoral Warfare,* Keynote Speech, International Maritime Defence Conference, Greenwich 7 October 1997.

Macksey, K. *For Want of a Nail,* Brassey's, 1989.

Magruder, C B. *Recurring Logistic Problems as I Have Observed Them,* Center of Military History, 1991.

Magwood et al, *Project Culebra: Sea Based Combat Service Support for Ship-to-Objective Maneuver,* Center for Naval Analysis, September 1995.

Marine Corps Concept Paper, *Operational Matieiiier From the Sea,* Marine Corps Command and Development Center, June 1996.

McManus, N, Head of Strategy and Investment, British Aerospace. 'Strategic Enterprise Planning'*, Proceedings of a Conference on Optimising Information Flows to Enhance Demand Chain Visibility*, London, 12/13 January 1998.

Moore, R S, Lt Col US Marine Corps. 'Maneuver From the Sea ... Maybe', *Marine Corps Gazette*, April 1996, pp. 24-27.

Moore, R S, Lt Col US Marine Corps. 'Blitzkrieg from the Sea - Ten Years Later', *Beachhead*, 1995, p 6.

Mundy Jr, C E, Gen. 'Reflections on the Corps: Some Thoughts on Expeditionary Warfare', *Marine Corps Gazette*, March 1995.

Noble, P et al. 'Development of a Diesel Powered, Heavy Lift, Amphibious Air Cushion Lighter Syvtem for the US Army', *Marine Technology*, Vol. 31, No. 3, July 1994, pp. 161-167.

Pierce, T, Cdr USN. 'Operational Maneuver from the Sea', *Proceedings*, Aug 1994.

Porter, M E. *Competitive Advantage,* The Free Press, 1985.

Selvage, D R, Col, 'Operation SEA ANGEL: Bangladesh Disaster Relief', *Marine Corps Gazette*, November 1991, pp. 89-97.

Smith, C R, *Angels from the Sea: Relief Operations in Bangladesh, 1991*, History and Museums Division, USMC, 1995.

Stewart, G, Director, PRTM. 'The Process-Driven Supply Chain', *Proceedings of a Conference on Optimising Information Flows to enhance Demand Chain Visibility*, London, 12/13 January 1998.

Styles, A K F. 'Management of Military Communications Networks', *Proceedings of the International Maritime Defence Conference*, Greenwich 7 October 1997, pp. 107-113.

Tasker, G T, Capt RM et al. *Examine the Logistic Problems Associated with a Rapid Amphibious Outload,* Unpublished Army Staff College Report, 11 December 1992.

Thompson, J. *The Lifeblood of War,* Brassey's, 1991.

Thorpe G C. *Pure Logistics,* National Defence University Press, 1986.

TOTI W J, Lt Cdr USN. 'Sea-Air-Land Battle Doctrine', *Proceedings*, September 1992, pp. 70-74.

Walter, D. 'Conversion of Maersk L Class Containerships to Strategic Lift Ro/Ro, Lo/Lo Ships', Marine Technology, Vol. 33, No. 1, January 1996, pp. 14-19.

Wareham, C D. *Competitive Logistics,* Institute of Purchasing and Supply, 1991.

White, M S, Maj Gen. 'How Can We Meet the Logistic Requirements of Forces Deployed at Some Distance From the UK?', *RUSI Journal*, October 1996, pp. 31-34.

Wild, R. *Production and Operations Management,* Cassell, 4th Ed, 1989.

Wilson, B. *Systems: Concepts, Methodologies, and Applications,* John Wiley & Sons, 2nd Ed, 1993.



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