STRATEGY RESEARCH PROJECT

TRANSFORMATIONAL LOGISTICS IN SUPPORT OF SEA BASING

BY

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ABSTRACT

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The Chief of Naval Operations (CNO) promulgated a broad transformational roadmap in "Power and Access... From the Sea". The roadmap presents Sea Basing as a new concept in staging, supporting, and reconstituting joint land forces from a sea base. Sea Basing will depend heavily on new, innovative approaches to logistics to both enable and support it. This paper reviews relevant cutting-edge logistics efforts (e.g., performance based logistics, material-in-transit tracking, forward positioning, just-in-time delivery, standardized COSAL, etc.) and presents necessary logistics transformations in order to realize the CNO's goal.

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TRANSFORMATIONAL LOGISTICS IN SUPPORT OF SEA BASING

Transformation within the U.S. Navy is very much a new concept. It was formally introduced by the Chief of Naval Operations, ADM Vern Clark, during a presentation to the U.S. Navy War College in June, 2002. Since that speech the concept has been distributed Navy-wide in the "Naval Transformation Roadmap: Power and Access... From the Sea". The roadmap clearly makes the case for transforming into new warfighting capabilities, which are presented in detail. The core concepts are: Sea Strike, Sea Shield, and Sea Basing.

Sea Strike is predominately defined by Ship-to-Objective Maneuver (STOM). More specifically, this is "the projection of a combined arms force from ships directly against operational objectives, some located far inland."[1] The concept of Sea Shield allows forces to operate safely despite enemy efforts to deny access. Lastly, Sea Basing is intended to "maximize the ability of the naval service to conduct sustained, persistent combat operations..."[2].

While the transformational fighting capabilities have been conceptualized, the underlying logistics support elements have not. For these transformational sea control and power projection capabilities to be truly effective, the Navy's supply capabilities will also need to transform. The Navy's legacy supply system has long met the Navy's needs of supplying deployed forces with both repairables and consumables, forward deployed and CONUS. The introduction of "Power and Access... From the Sea" adds additional requirements, however.

This marks a large departure from the traditional role of supply. It will require transformation in procedures of acquisition, the concept of self-sufficiency, logistics capabilities afloat, and communication with and visibility of assets, to include afloat units, forces ashore, as well as material in support of those forces. Individually, these changes are certainly not transformational, much as sea basing itself has been termed as a logical next step.[3] Most of the concepts, such as radio-frequency identification of shipments, are available using present day technology. Additionally, experimentation has been done by the services to evaluate initial feasibility of these concepts. The transformational aspect comes from the Navy's commitment to supporting the joint warfight from the sea. It is the commitment to providing 21st century logistics beyond ships and throughout the theater, and it is the combination of these ideas that provides the infrastructure for the transformed force.

Transformational warfighting from the sea will require a vast network of pervasive logistics to support it. Logistics that extends seamlessly from CONUS out to the furthest most units, and is built using an extensive communications and computer framework to enable timely and

accurate decision making. Transforming logistics must be given the highest priority to support a transformed warfight.

MILITARY ACQUISITION

The acquisition process is at the very heart of logistics support for warfighting forces. It is here that the support process begins, and without an efficient contracting and procurement process it is here where it will end as well. The past few years have seen a dramatic change in the approach towards parts procurement and stocking, however much progress still needs to be made to fully support the Sea Basing initiative.

In many regards, the Navy Supply System still operates the way it did ten or twenty years ago. Requisitions are often submitted, processed, and filled via a largely manual process that has been streamlined through automation at points along the way. The stocking of parts is frequently on an "insurance" basis. This means that parts are procured and placed on the shelf as an insurance against demand.

Initiatives that suggest the possibility of dramatic improvements in the procurement and stocking process have been embarked on in the past four years. Programs such as Performance Based Logistics (PBL), Contractor Logistics Support (CLS), and OneTouch Supply hint at revolution in supply system effectiveness, and they will be part of the solution in supporting Sea Basing.[4]

The concept behind PBL and CLS are closely linked. Fundamentally, the idea is for the contractor to assume greater responsibility and risk with respect to parts support. Rather than the government procure and stock parts, a contract is signed with industry for them to stock and provide the repair parts. The government avoids the costs and other drawbacks (e.g., obsolescence and shelf life) associated with warehousing the parts, and industry assumes a greater role as a parts provider with a monetary incentive. This monetary incentive can be tied to several different factors, including parts reliability and delivery performance. Under a parts reliability incentive, the manufacturer is paid for building reliability into their product. Somewhat paradoxically, this could be seen as paying the contractor for not providing parts. In reality, though, this incentive is pursued only in cases where improvements in a system's operational availability through more reliable components can be documented. The CLS concept takes PBL a step further, and has the contractor providing the full spectrum of logistics support. This includes not only repair parts, but also training, support equipment, repair, design interface, technical data etc.

At present, only a small fraction of contracts let are done so as PBL/CLS. The existing PBL/CLS contracts are primarily with major defense contractors such as Lockheed Martin and Raytheon and cover entire mature systems or product lines (such as Phalanx or Chesterton Company's pumps.)[5] The reason for this is that each PBL or CLS must go through a lengthy cost-benefit analysis – a process which can routinely last over a year.

The Supply System has realized the benefit in allowing major contractors the ability to assume profit and risk from making stocking decisions through PBL and CLS. These must now be extended to other, smaller, contractors as well and made available for the spectrum of systems and repair parts. To accomplish this, the PBL/CLS establishment process must be streamlined. By taking into account historical prices along with a selection from a menu of PBL support options and proposed costs provided by the contractor, a PBL/CLS decision can be rendered in weeks instead of a year or longer. Allowing contractors to present their business case using this process will permit a much greater proportion of repair parts to be supported rapidly and more robustly direct from the contractor.[6]

Where PBL and CLS remain unfeasible, other improvements in the procurement process are required. Allowing officials the ability to use the government credit card to enter into contracts is fundamental in this. At present, all contracts must be paid through a lengthy and involved process that involves significant overhead and final payment by DFAS. The government credit card, with a cap of $25k per purchase, could be used for a vast number of low-unit purchases and greatly streamline the procurement process – turning a process which today routinely takes upwards of two weeks into one which is done in two hours.[7]

The Military Standard Requisitioning and Issue (MILSTRIP) process must be redesigned to allow for flexibility in procurement. MILSTRIP was designed during the key-punch computer era and allows for a standard 80 card column requisition that is strictly formatted.[8] Situations such as the lack of a centrally assigned stock number (NSN) routinely consign requisitions to a lengthy process of manual entry and review today. These somewhat more complicated procurements must be allowed for in a Supply System that supports the forward-based warfighter. Non-standard requests will become both more frequent and urgent as Sea Basing shifts the focus from resupply of ships to resupply of forward units.

Similarly, the efforts of the Supply System must be more accessible and centralized. Responsibilities such as contracting and expediting are performed redundantly by TYCOM staffs, Fleet Industrial Supply Center (FISC) personnel, and Naval Inventory Control Point (NAVICP) using separate computer systems. This provides a fractured and disjointed process to deployed ships and Sea Based units. By consolidating and centralizing these functions, a

consistent and accurate picture of procurements and shipments would be maintained. Central to this is the utilization of a single database to track all procurements and shipments. Using web-based technology, this database could be accessed remotely by deployed units as well as other concerned activities to provide a consistent logistics support picture.

The elements of acquisition process improvement seem, when taken individually, rather evolutionary rather than revolutionary. They are refinements to an acquisition system which has existed for years. However, there is no overarching understanding that the acquisition reform initiatives must be closely linked with each other. The steps of PBL/CLS, MILSTRIP reform, and single database have a synergistic effect when taken together. This is what provides revolutionary change.

Already some of these initiatives are underway. For example, the Supply System is moving in the direction of PBL and CLS, and the MILSTRIP process has been recognized as antiquated. But the current rates of progress in acquisition support will not support a robust Sea Based capability in the near- or medium- term. Taken in their totality, these changes in the Supply System would transform a labyrinthine legacy acquisition system into one which is easy to understand and navigate for everyone from the contractor to the forward-deployed end-user. They form the underpinnings for logistics support of Sea Basing.

TRANSFORMED SELF SUFFICIENCY

The self sufficiency of maritime forces has long been a hallmark of the U.S. Navy. Projecting forces across the globe and remaining on station for indefinite periods of time has become the norm. There is, however, significant transformation that must be undergone to support Sea Basing. Sustaining and reconstituting joint ashore forces from the sea is a large departure from the Navy's historical self sufficient capability, and will require enhanced capabilities of all ships as they operate forward together.

Support of Sea Basing from the sea will severely test the capabilities of naval forces. They will need to interoperate seamlessly, and be able to support each other logistically to a greater extent than is now possible. Key elements of this will be a dramatically improved Coordinated Shipboard Allowance List (COSAL), true stock visibility across the theater, and enhanced support of shipboard systems through commonality. These elements will accomplish both an increase in the effectiveness of self-support and enable support of the force ashore.

The COSAL is the afloat ships primary logistics document. It is tailored, by ship's system, for each individual ship and contains critical information such as: lists of components for systems, manufacturer's data, technical specifications, part numbers, and a listing of all spare

parts provisioned for that ship. There is no single more important document and resource than the COSAL in logistics support of the ship.

While the COSAL is an indispensable document within the lifelines of the ship, it becomes a source of significant confusion when viewed across a battlegroup or other force. The sparing models that are used within COSALs are inconsistent. Some systems are spared using a best replacement factor concept which looks at all parts with a failure rate of once every four years and considers them for sparing. Other systems are spared using a Readiness Based Sparing (RBS) concept which looks at failure points within an entire system and seeks to avoid downtime by optimizing repair parts loadout through the entire system.[9] Regardless of model, there are differences that result from running COSALs for different ships on different dates, as the historical failure rates will fluctuate from month to month. The final element that adds to the confusion are the various modifications that are done to the individual COSALs by the ship's storekeepers in running updates and adding demand-based allowances based on ship's actual usage.

The solution to this confusion is two-fold. First, RBS needs to be expanded across all shipboard systems. Strictly demand based COSALs do not consider system availability, only individual part failures. Parts with a greater failure rate are spared to a higher level, without regard of criticality within the system (e.g., redundancy or single point of failure.) Studies have shown that readiness-based sparing can achieve improved system availability at the same cost.[10] RBS models incorporate this knowledge to arrive at an optimal sparing level across the system.

Secondly, shore-based COSAL standardization must be accomplished. The frustration of not knowing what assets exist within a battlegroup must be eliminated. Central to this is standardizing allowances for the same systems onboard different ships and moving all COSAL functions ashore. By moving COSAL management and maintenance responsibility ashore (with the ship maintaining a duplicate database for their use) ship's configuration and allowances can be updated in near real-time. Modifications to the COSAL could be done in a controlled environment, and across platforms simultaneously.

By moving this manpower intensive process ashore, other efficiencies in storekeeping result as well. The afloat process is simplified to reporting transactions (stock issues) and receipts. Reorders, including new provisioning, are all handled remotely from ashore. Required financial reports are also processed automatically with no ship workload requirement.

A requirement for this process is stock visibility. At present, asset reporting is done via a manual process. The ship's storekeeper must extract the information from the ship's database

and then transfer it ashore via a floppy disk and telephone connection. This process needs to become completely automated, and include information on transactions as well as simple on-hand balances. By centrally managing this automatically transmitted data ashore, ships can actively and accurately query for parts availability in support of themselves. Forces ashore can equally rely on the robust supply network presented by the battlegroup itself.

The result is a naval and shore force that can truly rely on each other to handle emergent part requirements. The days-long process of MATCONOFF (material control officer) screens around the battlegroup to determine parts availability is shortened to minutes via a query across standardized COSAL databases. Parts support ashore is similarly simplified.

Enhanced self-sufficiency is a vital component in support of Sea Basing. The groundwork for the involved requirements of sustaining and reconstituting a force is laid in a straight-forward and comprehensible supply system afloat. From this seamlessly integrated network of logistics support at sea, the additional supply requirements unique to the land-based force can be built. The first step here is transforming self-sufficiency into a fast network of inter-ship sufficiency.

LOG BASE

Equally important as organic supply capability within the battlegroup is the ability to resupply from CONUS and forward bases. The most forward of these bases are those in-theater and directly offshore, the bases which function as sea bases within the Sea Basing concept. Their primary mission is to project and support the forces ashore, and they will be a new addition to the fleet.[11]

The Navy has had sea bases for quite some time. The ship classes of LHD and LHA, as well as a large variety of smaller amphibious ships and auxiliaries have performed the function of sustaining the Marine fight ashore since World War II. These ships have launched the Marine assault, provided supplies ashore, and then served as a recovery point once the objectives were met. However, this is only a portion of what future Sea Basing will require.

ADM Clark has directed that the sea base meet five criteria: pre-position warfighting capability, enhance joint support, increase joint force security, strengthen coalition building, and minimize operational reliance on shore infrastructure.[12] A number of different in-theater platforms have been proposed to accomplish these missions, among them a floating airport, and an enhanced version of the LHD. Both of these miss the mark, however. The abilities of a floating airport[13] are suspect – especially in a moderate or heavy sea state – and the "LHD plug plus"[14] as currently presented is a larger LHD built predominately for Marine support.

The solution lies in a platform which is both large and capable enough to support the joint force ashore, but also not too cumbersome and unwieldy to be deployable. This platform will be more similar to a large Maritime Prepositioning Force (MPF) ship than a warship, and will function as a floating logistics base.

The log base will be a multi-mission platform dedicated to supporting the joint forces throughout the theater. It combines the functionality of the floating airbase with that of a mobile MPF and command & control ship. It can act as the primary platform from which force is projected ashore as well as sustain, reconstitute, and relaunch that force. Equally importantly, it serves as the gateway for forces and material flowing into and out of theater.

Built on a hull similar to an "LHD plug plus", the log base will be fully accessible using a variety of support vehicles. The log base must be rapidly accessible from both sea and air in order to provide the maximum flexibility in resupply. The Army's Theater Support Vessel (TSV) is an excellent example of a fast and heavy sealift capacity that would be ideally suited for the log base. Capable of sustained speeds in excess of 40 knots, it can carry up to 850 short tons of equipment. It is also capable of carrying standard shipping containers, allowing for transport of "prepackaged" support modules or kits. While heralded by the Army as necessary for transformation, the capabilities of the TSV have been largely ignored by the Navy. It is an obvious candidate to provide rapid and responsive in-theater resupply to the transformational log base.

Heavy airlift will be provided by both rotor aircraft and ultralarge airships (ULA). A marine variant of the MH-47 would provide the services of primary utility transport vehicle. This rotor aircraft would carry cargos of up to 4,000 lbs a distance of 400nm at145 knots. Future enhancements to rotary wing aircraft will directly benefit the log base as well. For example, the Advanced Maneuver Transport (AMT) is being planned by the Army to carry 20 tons a distance of 500 kilometers[15]. A secondary means of resupply would be via ULAs. While currently in the conceptual phase, they are envisioned to have greater capacity than the TSV. The SkyCat ULA will be able to carry 1000 short tons at 100 knots for distances up to 8,000 nm[16]. Like rotary wing, ULAs are able to take off and land vertically, so the log base would not require the use of fixed-wing aircraft.

At a slightly greater investment in technology and manpower, however, the log base could be made fixed-wing capable. Use of existing arresting gear and catapult technology would make it next-generation C-2 capable, with a payload of 10,000 lbs and a range of over 1,400 nm. In the next few years, the electro-magnetic aircraft launching system (EMALS) will provide even greater capability to aircraft catapults.[17] The EMALS would be a perfect system for the log

base due to its increased reliability, lower manpower requirements, and increased launch capability (i.e., reduced wind-over-deck requirements.) With the C-2 airframe at an age where constant upgrades are required to keep them flying, consideration of an EMAL-tailored replacement cargo aircraft would benefit both the log base and next generation carrier (CVNX). An example existing program which could be adapted to naval use is the Army's Advanced Theater Transport (ATT). The ATT will be a super-short takeoff and landing aircraft, requiring only a 750-foot runway and capable of carrying 40 tons. An EMAL-capable ATT variant would dramatically increase the lift capability to the log base.

The log base fundamentally reduces the need for Air Ports of Debarkation (APODs) ashore. It helps solve the frequent theater issues of basing and overflight rights, by providing an offshore mobile base. It also leverages existing programs such as TSV, AMT, and ULA to make it an integrated part of the joint force. The use of common transport vehicles means both reduced costs and enhanced interoperability, while meeting all the resupply requirements. In practice, the majority of stores, munitions, and other supplies onboard the log base will be pre-staged onboard and thereby avoid loadout or airlift time. This is an extension of the pre-positioning concept currently in use for equipment on MPF ships, and similar to the COSAL concept for support of ships. Built by analyzing past and predicting future support for ashore systems, the loadout of the log-base will be tailored to support whatever joint forces (and systems) are ashore. Emergent materials and additional personnel will arrive at the log-base from CONUS or other forward bases via TSV, ULA, AMT, or from other Navy ships. Transportation ashore will then be provided by hovercraft, V-22, or rotary wing.

To adequately implement a complex loadout in support of ashore forces, new onboard inventory technology will be employed. Rather than the traditional bulk storerooms of Navy ships, the log-base will employ an automated, modular inventory system. Stores will be loaded by module, with units being tailored based on system being supported. The entire system of storing and accessing modules will be performed via automation, similar to a high-tech warehouse. This system will accurately track the status of onboard inventory, allowing for timely reorders, while simplifying the picking and staging process.

The requirement for a fully capable log base is driven by the Navy's requirement to support the joint warfight ashore. It is not intended to be a high-performance ship such as the CVNX or next generation land attack destroyer (DDX), however it is equally relevant to future military requirements. CVNX and DDX will provide for impressive Sea Strike and Sea Shield capability by virtue of expansive air strikes and precision guided munitions fired at shore targets. The floating log base's mission will be to provide the next step in support to ashore forces. It

goes well beyond the Marine-support abilities of the "LHD plug plus" by recognizing that conflicts of the future will require complete support for all joint forces ashore. It utilizes common equipment, such as the TSV and AMT, adding benefits of interchangeability. The land force support capabilities of the log base will be required to support Sea Basing and will greatly promote the joint warfight ashore.

RESUPPLY FROM OUTSIDE THEATER

The floating log-base is a cornerstone concept of Sea Basing, however it will require resupply itself as well. This introduces the transformation that is required in resupply from outside the theater: material shipment from CONUS to the log-base via supply channels.

The existing supply system has material flowing from (or through) the main overseas supply bases in Bahrain, Yokosuka, or Sigonella. While the capabilities of these bases have grown substantially, there are drawbacks with respect to their location as well as the existing "fire and forget" paradigm of shipment.

With respect to location, resupply of the sea base from an existing overseas base may often be difficult or impossible. The Navy was fortunate during Operation Enduring Freedom to be so close to Bahrain. However, the resupply effort to the forces in the north Indian Ocean was an all-encompassing effort and far from an unqualified success. The lift capacity to the carrier battle groups was quickly filled, and a complex juggling act of balancing passengers, cargo, mail, and other supplies headed in both directions ensued. The use of multiple resupply ships to augment carrier aviation only eased the problem. Complicating matters was an inability to identify and prioritize (by criticality) cargo headed to the ships. This was very similar to the problems faced in Operation Desert Storm where entire shipping containers of vital material were left at the staging area due to the huge volume in traffic and inability to identify contents.

Part of the solution is developing a capability to streamline the pipeline of material to bypass existing forward bases and flow directly to the theater. This would be done not at the expense of the existing forward bases, but rather as a complementary ability for the most critical material.

Developing outside theater supply will require investment in new technologies and capabilities, but is vitally important to supporting the sea base. The first step is to fully develop a material in-transit tracking system using radio frequency (RF) transponders so that all shipments are visible throughout the supply chain. Coupled with a Global Positioning System (GPS), material in transit would have worldwide traceability. Such systems are currently in

prototype for the most expensive depot level repairables (DLRs)[18], but will need to be made available for all shipments.

The advantages to complete traceability are profound. By developing a complete picture of material in transit, lost and misdirected shipments can be prevented. Misrouted material can be similarly traced and sent on to the correct destination. More significantly, material could be rerouted from one unit to another due to urgency of need. Material in transit remains a part of inventory until it is received, maintaining flexibility in the supply chain process to the very end.

Another element in solving resupply from outside theater is to expand the capabilities of the existing forward bases. Sigonella and Bahrain operate almost exclusively as throughput stations, with almost no non-aviation material stored or staged for use there. Yokosuka operates as a fully capable supply depot, with both a Navy Fleet Industrial Supply Center (FISC) and a DLA Defense Distribution Depot collocated on site. The element of support that is missing from all three forward bases is tailored material packages in support of operating units.

There are volumes of historical data in support of requirements for deployed forces for everything from minesweepers to entire carrier battlegroups.[19] Yet supplies for these forces routinely ship from CONUS, and not from a forward base. Staging customized packages in support of, for example, fast attack submarines would dramatically cut shipping time. Most of the requirements for a ship remain consistent across hulls. Especially consumable items have a regular and predictable demand. Forward-basing these materials as close as possible to their customers fully supports the Sea Basing concept. The concept of staging support kits has historically foundered on the budgetary issue of what funds would be used in resupply of the kits.[20] While an important question to resolve, the support of Sea Based forces necessitates material moved far forward when possible.

Complete traceability of shipments and moving stock forward allows for a transition from traditional "just in time" (JIT) inventory practice to an optimized "just in case" (JIC) policy. In Navy practice, JIT frequently hasn't lived up to its expectations.[21] Time and again, critical material in support of requirements has missed – albeit not by much – battlegroup sail dates and other critical milestones. At the same time, a large shore infrastructure of expeditors and material managers has grown to try and make JIT work.

In contrast, the JIC inventory policy holds that some supplemental material must be budgeted for to allow for the inevitable situational changes. It allows higher inventory levels for the most critical items, which will lead to some higher costs. By moving material forward and maintaining the ability to trace and, when necessary, redirect material in-transit an optimized JIC would result. This would tradeoff the increased costs of greater inventory with the decreased

requirement for inventory by forward staging and material tracking, as well as the savings from reductions in shore-based expeditors and trackers.

Material in-transit visibility and moving stock far forward are important elements that greatly streamline the process of resupply from outside theater. They are two essential pieces to bringing unforeseen critical material forward. Combined with the log base concept, this is truly a transformational approach to staging, shipping, and providing material forward.

PERVASIVE LOGISTICS

Pervasive Logistics is a new concept, and ties in elements of the previous chapters with additional communication and computing ability. The "pervasive" idea originates with pervasive computing, with the ultimate goal being to "seamlessly blend the analog human world with all things digital."[22] For the consumer, this means an environment of computers and devices which automatically work together, whether at home, in the office, or elsewhere. This was a very lofty goal when first introduced, however significant progress has been made. For example, researchers have designed a 9 oz. computer smaller than a pack of 3x5 index cards with the capability of a mid-range Pentium computer.[23] These are the types of devices which will enable pervasive logistics to transform the last mile of the supply chain.

By equipping forward forces with pervasive computing devices, much of their supply needs will be performed automatically. These computers will combine the several capabilities, such as global positioning system, inventory monitoring, and reordering. By tying the real-time information into the supply system, material can be automatically pushed to the right location at the right time.

The MILSTAMP (military standard transportation and movement procedures) process is one which will benefit greatly from pervasive logistics. Presently, ships and units must provide their present and future locations via standard message. On the part of the unit, this is an entirely manual process that affects where all of their mail, cargo and frequently personnel are routed. This commonly leads to inefficiencies in shipment routing, as schedules and employments rapidly change. Pervasive computing devices would automatically provide information on a unit's location and keep material from being routed to a prior port-of-call.

Pervasive logistics will also enhance the concept of "velocity management" for the last mile. Velocity management is the principle of emphasizing speed over volume, and quality over quantity in providing material.[24] The concept was pioneered for the U.S. Army, but has applicability across all forces that are supported from the sea. Its initial inception was from a recognition that the existing supply process was cumbersome and largely unresponsive to

emergent needs. In its current form, it is a process of improving the speed of the supply chain through examining the individual links and interfaces between them, and then streamlining the process.

Pervasive logistics adds on to this by providing real-time information regarding a unit's requirements. Inventory usage can be reported at the time that it is issued, automatically generating a reorder. Additional detail regarding rate of inventory usage can help predict future demand and be used to preorder (i.e., push) material to the unit. Reliability of repair parts can also be instantly measured and used to assess possible defective material. This information could lead to a rapid screening of remaining inventory and/or notification of defects to the manufacturer.

Pervasive logistics will play a key role in another aspect of velocity management, performance monitoring, as well. Developing metrics and evaluating their performance remains a key element of velocity management. The Navy has long recognized the importance of measuring elements such as customer wait time, logistics response time, requisition response time, etc. This has been tempered, however, by a lack of standardization that begins with the definition of these metrics and carries on to the way that they are measured and the databases which hold the data. The information that is gathered is further skewed by frequently omitting groups of data. The result is a confusing and conflicting picture of supply chain performance, and the resulting analysis can focus on defining what the "real" picture is rather than in making improvements. Pervasive logistics would fix this process. Beginning with the data gathering, and continuing on through a single database repository, the true logistics picture would emerge. The data, from requirements generation through order shipping and receipt, would all be generated automatically. It would also be consistently reported across all shipments, units, and theaters. The capabilities of pervasive logistics would quickly identify flaws in the supply chain and focus attention on enabling velocity management to its fullest.

The final benefit of pervasive logistics is the information that can be relayed back to the ship or unit. Real-time and automatic updates will be provided to the unit regarding material in-transit, including location and ETA. An accurate understanding of what material is coming and where it is will lead to commanders' being able to make more knowledgeable assessments of their own capabilities and decisions regarding unit employment. The information that is relayed is from a query of the entire supply chain, with input from CONUS, forward bases, and the supporting log base.

The requirements for pervasive logistics hinge on sufficient bandwidth being available. This need not be a constant tie-in to a satellite or other provider, and can be done on a periodic

as-needed (or as-available) basis. The type and amount of data that is to be transmitted is within the capabilities of existing tactical systems, especially when considering that it can be done during otherwise idle transmission times. Besides bandwidth, the network of logistics computers – down to those operated by forward ships and units -- needs to be refined so that they communicate seamlessly. This is a greater task, but an investment that is well worth making.

The benefits of pervasive logistics to the military are profound. It cuts through the confusion that has always been associated with the supply system, and builds confidence in a system that works. Pervasive logistics optimizes velocity management and identifies weaknesses in the supply pipeline as they occur. Combined with the other concepts of transformational logistics, it completes the support that is required by Sea Basing.

SUMMARY

There are many elements to transformational logistics in support of the Sea Basing concept. Taken separately, they are rather evolutionary in nature. Their true power comes from a synergy of their effects, and their combined support of Sea Strike and Sea Shield, as well as the joint force.

It begins with reforming the military acquisition process. A dramatically improved procurement process is the cornerstone for logistics transformation. By utilizing PBL and CLS contracts wherever possible, and streamlining the process for designing and implementing them, significant improvements in the availability of parts from the industrial base will result.

Transformed self-sufficiency is another key element. The long-standing COSAL document needs to be retooled to reflect current day needs and requirements. Implementing RBS across the entire COSAL and optimizing the parts loadout is a first step. Managing the COSAL from ashore, and thereby consistently maintaining a quality product across the entire fleet, is the next step. Enabling both of these to their full effectiveness is visibility of the storeroom from beyond the lifelines of the ship. The result is an improved self-sufficient capability that is predictable and understandable. This allows the best possible support from both ashore and organically within theater.

Resupply from outside theater focuses on additional improvements that must be made outside the theater. Key elements of this are complete shipment traceability and enhanced capabilities of the forward bases in Bahrain, Sigonella, and Yokosuka. Savings resulting from improved shipment visibility will offset the additional costs of an optimized "Just in Case"

inventory system. Tailored support packages, based on historical deployment data, should be staged at each of those bases in anticipation of forward forces.

The log base is a new class ship which is required to support the joint force ashore. It is an extension of the MPF concept, allowing for sustained Sea Based support of all forces in theater. Combining both an expansive MPF-style loadout and a resupply capability of additional and emergent requirements that utilizes service-common vehicles from both land and air, it is capable of acting as a true forward base in every sense. At the same time, it has the mobility expected of such an important and necessary asset. The log base is a technological breakthrough, implementing several improvements developed in the designing of DDX and CVNX, whose mission is entirely devoted to Sea Basing.

Lastly, pervasive logistics ties together pieces of the other elements of transformation in managing the supply chain down through the last mile. Automated reporting of unit location and material requirements will lead to improved support, oftentimes in advance of needs. Consistent and regular reporting of metrics data will lead to rapid identification and correction of problem areas. Pervasive logistics provides timely and necessary support information to the ship or unit commander.

These five elements combined define Sea Basing. The Chief of Naval Operations, ADM Vern Clark, envisioned it as, "the foundation from which offensive and defensive fires are projected – making Sea Strike and Sea Shield realities."[25] Sea Basing supports the joint forces ashore, and improves their agility and survivability. VADM Charles Moore, Deputy CNO for Fleet Readiness and Logistics, has stated that, "Twenty-first-century Sea Basing will be our nation's asymmetric military advantage, contributing immeasurably to global peace, international stability, and warfighting effectiveness. It is the key to operational independence in the dangerous decades before us."[26] The time is right to pursue the requirements of Sea Basing. We should start now so that it will be available when called upon to support the transformed force in tomorrow's warfight.

WORD COUNT= 6,019

ENDNOTES

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[2] Ibid, 27

[3] Chris Wagner, "Resurrection of an old concept: Sea Basing," Proceedings, December 2001.

[4] Melissa Shannon, "PBL and CLS," briefing slides with scripted commentary, Naval Inventory Control Point, 21 February 2002.

[5] RDML Michael Finley, SC, USN, "PBL Status Update," briefing slides with scripted commentary, Naval Inventory Control Point, 12 June 2002.

[6] CAPT Ernie Styron, SC, USN, interview by author, 20 May 2002, Naval Inventory Control Point, Mechanicsburg, PA.

[7] Ibid.

[8] Department of the Navy, Naval Supply Procedures NAVSUP P-485 Rev. 3, Washington, D.C.: U.S. Department of the Navy, 21 October 1997, 3-13.

[9] Joseph Bruno, "COSAL Initiatives," briefing slides with scripted commentary, Naval Inventory Control Point, 25 April 2002.

[10] RBS Working Group, "Readiness Based Sparing Readiness Indicator Evaluation", Naval Sea Logistics Center, var.

[11] The ideas in this paragraph are based on remarks made by a speaker participating the Commandant's Lecture Series.

[12] ADM Vern Clark, "Projecting Decisive Joint Capabilities," Proceedings, October 2002

[13] Naval Facilities Engineering Service Center, "Mobile Offshore Base," 22 November 2000; available from <http://mob.nfesc.navy.mil>; accessed 2 January 2003.

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[18] Robert Tinker, "Re-engineering Material In-Transit/Stock In-Transit (MIT/SIT)... Ensuring Material Accountability and Visibility", Navy Supply Corps Newsletter, July/August 2001.

[19] John Baumgardner, interview by author, 17 April 2002, Naval Inventory Control Point, Mechanicsburg, PA.

[20] Ibid.

[21] CAPT John Drerup, SC, USN, interview by author, 7 June 2002, Naval Inventory Control Point, Mechanicsburg, PA

[22] Computing goes everywhere, Technology Review, Cambridge, Jan/Feb 2001, Robert Buderi

[23] Back to Basics, Dr. Dobb's Journal, San Mateo, May 2002.

[24] RAND Review, Spring 2002, Vol. 26, No. 1.

[25] ADM Vern Clark, USN, "Sea Power 21 Series," Proceedings, Oct 2002.

[26] VADM Charles Moore, USN, LGEN Edward Hanlon, USMC, "Sea Power 21 Series," Proceedings, Jan 2003.

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