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NAVAL WAR COLLEGE

NEWPORT, RI

THE MOBILITY TRIAD AND CHALLENGES FOR THE OPERATIONAL COMMANDER

By

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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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5 February 1999

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REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED	
2. Security Classification Authority: N/A	
3. Declassification/Downgrading Schedule: N/A	
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.	
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT	
6. Office Symbol: C	**7. Address**: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207
8. Title (Include Security Classification): THE MOBILITY TRIAD AND CHALLENGES FOR THE OPERATIONAL COMMANDER (U)	
9. Personal Authors: BRIAN H. ANDERSON, MAJOR, USA	
10.Type of Report: FINAL	**11. Date of Report**: 5 February 1999
12.Page Count: 17	
13.Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.	
14. Ten key words that relate to your paper: mobility, triad, strategic, deployment, projection, airlift, sealift, prepositioning, C-17, LMSR, ASMP	
15.Abstract: The Mobility Triad of airlift, sealift, and prepositioning is a successful strategic concept, but lacks depth in its structure to accomplish the mobility mission down to the operational level. The structure is designed for strategic employment, but does not integrate well into theater requirements, without operational trade-off. This paper will discuss the significant advantages and disadvantages the operational commander must address in order to fulfil their deployment requirements.	

16.Distribution / Availability of Abstract:	**Unclassified** X	**Same As Rpt**	**DTIC Users**
17.Abstract Security Classification: UNCLASSIFIED			
18.Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19.Telephone: 841-6461		**20.Office Symbol**: C	

THE MOBILITY TRIAD AND CHALLENGES FOR THE OPERATIONAL COMMANDER

THESIS: The Mobility Triad of airlift, sealift, and prepositioning is a successful strategic concept, but lacks depth in its structure to accomplish the mobility mission down to the operational level. The structure is designed for strategic employment, but does not translate well into theater requirements, without operational trade-offs. The Mobility Triad brings with it challenges and constraints for the operational commander. Each element of the Mobility Triad has significant advantages and disadvantages the operational commander must address in order to fulfil their deployment requirements.

BACKGROUND

Deployability remains an essential element of our nation's ability to rapidly respond to contingencies ranging from flexible deterrent operations (FDO) to major regional conflicts (MRC). "The key to operational success is our ability to rapidly move our combat power to a supported commander in chief's (CINC) theater, ready for mission execution...'We must be the world's premier deployer.'"[1] To that end, the mobility mission for the military plays a critical role in national military strategy, but relies on action at the operational level to implement the advantages of US global response capabilities. While joint reception, staging, onward movement, and integration (JRSOI) of forces is an essential part of the deployment process, JRSOI is not part of the Mobility Triad and will not be addressed in this paper.

Lessons learned from Operations Desert Shield/Desert Storm required the Department of Defense (DoD) to heavily invest in the US military's ability to deploy. Global mobility became paramount in establishing the US as a world power to compensate for force

[1] Office of the Joint Chiefs of Staff, Joint Vision 2010, Focused Logistics, 1998, p.5

reductions and withdrawal of forward deployed forces. Besides the procurements required to strengthen mobility forces, the US needed to improve and upgrade infrastructure. After careful examination, the DoD conducted a review of the Desert Shield deployment and conceived the Mobility Requirements Study (MRS) in 1992.

The MRS set forth strategies to reinvigorate declining US strategic deployment capabilities, modernize facilities, and integrate technologies to provide asset visibility. Moreover, changes to the national defense strategy were focused on new fundamentals of "strategic deterrence, forward presence, crisis response, and reconstitution."[2] Although US defense strategies had always relied on strategic deterrence, force restructuring required considerable change in *how* US forces provide forward presence and responds to crises.

Strategic Mobility Mission Statement

As part of the MRS requirement, each service developed long-range plans to address their deployment procedures. The most notable program developed was the Army's new force configuration packages, designed through a capabilities based approach to streamline the deployment process. The Army Strategic Mobility Program (ASMP) position statement provides that: "The lead brigade of such a force projected for combat operations will be available of being on the ground by C+4 (airlift), the lead division by C+12 (airlift), and two heavy divisions deployed from CONUS or OCONUS by C+30 (air/sealift). By C+75, the full corps (remaining two divisions), with its corps support command (COSCOM) and appropriate... logistics support will be on the ground."[3]

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[2] Office of the Joint Chiefs of Staff, The Mobility Requirements Study, 23 January 1992, Sections I-IX
[3] Office of the Deputy Chief of Staff of the Army-Logistics, The Army Strategic Mobility Program Video, 551-0219-B, 1993

The *Power Projection* concept exemplified in the ASMP position statement, coupled with existing service requirements places a heavy reliance on larger, more capable mobility assets, but does not specifically address their integration into operational requirements. After the MRS and subsequent bottom-up-review updates (BURU), the DoD undertook an aggressive modernization program to enhance aging deployment forces. This paper will focus on these improvements in the Mobility Triad, anticipated shortfalls, and concerns for the operational commander.

DEPLOYMENT PROCESS

To better understand DoD's mobility capabilities a baseline of the inter-relations of the deployment process follows. Initial deployment sequences usually commence with activating airlift, sealift, and prepositioning of assets for deployment to a theater of operations. It is the US Transportation Command's (USTRANSCOM) mission to provide common user "air, land and sea transportation for the Department of Defense both in time of peace and time of war."[4] To accomplish the mission, CINC USTRANSCOM has combatant command authority of Military Traffic Management Command (MTMC), Air Mobility Command (AMC), and Military Sealift Command (MSC). As a member of the Joint Planning and Execution Community, USTRANSCOM plays a critical role in orchestrating the roles of mobility forces during the deliberate and crisis action planning processes.

As forces begin to deploy to a theater, the earliest deploying forces will either self deploy as in the case of Navy battle groups, expeditionary Air Forces, and Marine units that arrive on existing amphibious shipping; or forces will deploy using common user mobility assets provided by USTRANSCOM. While the theater buildup continues the capabilities of

[4] US Transportation Command, USTRANSCOM Mission Statement, http://www.ustcweb.safb.af.mil/missions/mission.html

each method of deployment will increase as reserve component forces dedicated to the mobility mission mobilize. Airlift is the most responsive method of deploying forces to a theater of operations. US air mobility assets are quick and agile but are limited in the amount of tonnage they can move. Sealift forces require anywhere from four to thirty days to activate and are not as responsive as airlift or prepositioned assets. However, sealift provides the most robust capability and will typically deliver upwards of 95% of forces and sustainment supplies to the theater. Over the course of a hypothetical contingency, each element of the Mobility Triad will significantly contribute to the build-up of forces, but theater reception capability will usually prove to be the limiting factor in a deployment.

MOBILITY TRIAD

The most significant revision required by the MRS was to rejuvenate the Mobility Triad of air, sea, and prepositioned forces. Subsequent MRS-BURUs continued to reinforce the need for long-term investments in modernizing mobility forces. Specifically, the procurement of new airlift assets, and a new variant of roll on/roll off (RO/RO) ship have proven to be the cornerstone in each of the studies. To complete the strategic linkage, JRSOI was introduced to capture operational techniques and procedures which also needed updating and further development to support the total force. These improvements would then give the US the ability to employ a *Power Projection* military, capable of deploying to any mission spanning the continuum of military operations.

Airlift Assets

Support for the theater commander in the 21st century will require placing higher demands on AMC's air mobility assets. The aging C-141B Starlifter has been providing the core capability of AMC's airlift fleet for well over 35 years but its projected service life will

end in 2006.[5] AMC's answer to the loss of the C-141 is the procurement of the C-17 Globemaster III. Although gross tonnage capabilities will remain relatively constant with the purchase of 120 C-17's, the number of available mission aircraft is significantly less than the 270 C-141's that provided almost four decades of service.

As the C-141 fleet begins its retirement phaseout, procurement of the C-17 is scheduled to continue. In 1993, the Defense Acquisition Board (DAB) considered restricting the number of C-17's to forty. To compensate for the loss of lift, the DAB proposed an alternate course of action and considered increasing the reliance on the Civil Reserve Air Fleet, conversion of commercial designed non-developmental airlift aircraft (NDAA), and enhancing the C-130 fleet to make up any unattained differences.[6] Fortunately, this course of action was withdrawn with no impact on the C-17 program.

The C-17 is far more efficient than any other airlifter is to-date. Within any given theater, the C-17 is more capable of delivering required tonnages and forces than the C-130 alone. The C-17's ability to move out-sized cargo such as the Bradley Fighting Vehicle, Patriot Missile System, and the M1 Tank will also provide the operational commander with greater flexibility and freedom of action.[7] Though there is no shortfall in tonnage capacity with the accession of the C-17, having a fleet less than half the size of the C-141 may significantly reduce the availability of C-17's for theater use. The reduced numbers of C-17's may require the operational commander to rely on the less capable C-130; effectively eliminating the ability to *reposition* outsized cargo within a theater of operations.

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[5] US Department of the Air Force, "Fact Sheet" C-141, <http://www.af.mil/news/factsheets/C_141B_Starlifter.html>, (4 February 1999)

[6] Boeing Corporation, "McDonnell Douglas Press Release", McDonnell Douglas Starts Assembly of First C-17 Under Multi-Year Contract, <http://www.boeing.com/news/releases/ mdc/97-119.html>, (4 February 1999)

[7] Rand National Defense Research Institute, Should C-17's Be Used to Carry In-Theater Cargo During Major Deployments?, 1997

The C-5 Galaxy is still heavily used to provide strategic lift for out-sized cargo despite being hampered by low reliability ratings. Unfortunately, due to its size and requirement for extensive basing support, the C-5 is an unacceptable candidate for theater support airlift. As the C-5 continues to age, it is not unrealistic to expect reductions in allowable cabin limits that have plagued the last few years of the C-141.

In addition to the C-141, C-17, and C-5, AMC retains a sizable airlift capability in its aerial refueling fleet. The KC-135 Stratotanker and KC-10 Extender both have the capability to transport cargo in addition to their primary function as tankers. The older aircraft of the two, the KC-135, has been in active service for more than forty years and is currently undergoing a $1.7 billion upgrade that should extend it's service life well into the next century.[8] The latest addition to the Air Forces' tanker fleet—still almost 20 years old—the KC-10 has a projected service life to 2043.[9]

The Civil Reserve Air Fleet (CRAF) provides a significant part of AMC's mobility resources. Categorized by three main segments: long range international, short-range international and national/domestic segments, CRAF will move up to 95% of military personnel to a theater. In order to join CRAF a commercial air carrier must meet certain requirements regarding air service, crew availability, and must utilize US registered aircraft that are capable of overwater operations. Some 38 carriers are enrolled in the CRAF program, contributing incremental activation of over 680 aircraft. When fully activated CRAF accounts for 93% of all US passenger aircraft and 32% of the US air cargo fleet.[10]

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[8] Boeing Corporation, KC-135 Data Sheet,< http://www.boeing.com/defense-space/military/kc135-strat/>, (4 February 1999)

[9] US Department of the Air Force, "Fact Sheet", KC-10 Extender 93-14, <http://www.af.mil/ news/factsheets/ KC_10A_Extender.html>, (4 February 1999)

[10] US Department of the Air Force, "Fact Sheet" Civil Reserve Air Fleet, <http://www.af.mil/news/factsheets/ Civil_Reserve_Air_Fleet.html>, (4 February 1999)

CRAF assets are crewed by civilians and may not be utilized in any other method than originally contracted. Payment for CRAF aircraft is accomplished through the contingency contracting process at fixed rates. Therefore, it is better to fully use CRAF assets when the mission allows, by maximizing passenger and cargo loads then use military airlift assets to move the balance. Keeping military airlift assets freed up from hauling standard cargo loads provides the operational commander with the flexibility to respond with his most capable mobility assets.

As stated earlier, AMC tanker aircraft and other commercial assets provide unique opportunities to move cargo. To off-load of these aircraft, however, requires specialized materiel handling equipment (MHE) to reach the cargo doors. Without this MHE, any cargo transported aboard civil-designed aircraft will always arrive some 15-20 feet short of its destination (15-20 feet being the distance from the ground up to the aircraft's cargo door). Ironically, the C-5 and C-17 are the only aircraft capable of delivering the necessary MHE to off-load these aircraft. When properly sequenced to arrive early on in a deployment, this MHE can greatly increase the theater's ability to receive cargo. This will also allow the operational commander to capitalize on the cargo hauling ability of *assigned* air-refueling assets and supplement theater airlift assets.

The chart at Figure 1 depicts the cumulative contributions of US airlift capabilities. At full mobilization, AMC aircraft only make up 60% of the required objective. The remaining tonnage is made up through the CRAF program. Airlift capabilities consider availability rates of each air asset when determining requirements for tonnage. Realignment of AMC assets to accommodate the aerial refueling requirements for Air Expeditionary Forces (AEF) will reduce airlift capability by approximately ten percent. To counter the

effects of this decrease in airlift capacity, AMC will require additional airlift assets. These assets are likely to come from theater support sources and the numbered air forces, and will further reduce theater airlift asset availability.

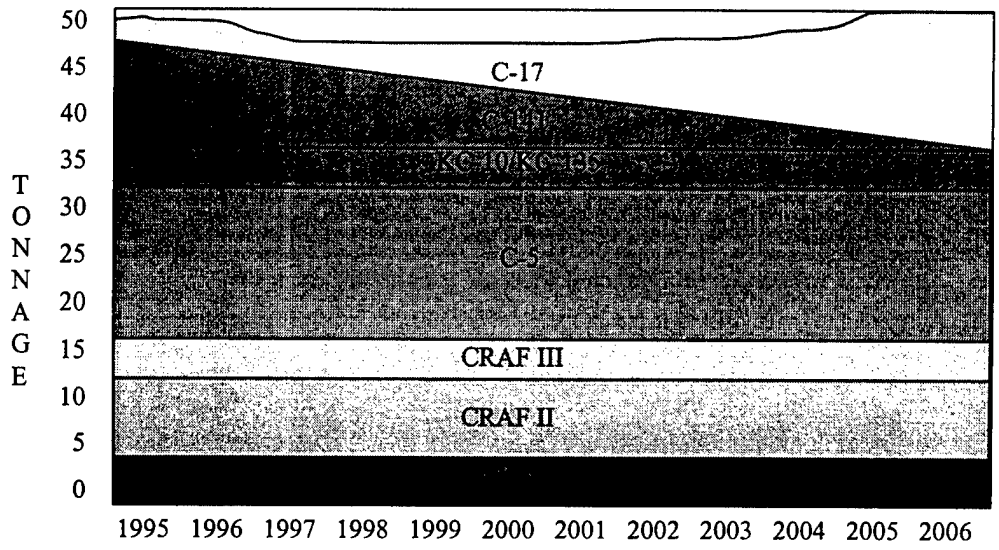

FIGURE 1

An analysis of airlift infrastructure would not be complete without examining operational support airlift (OSA) aircraft. Ranging in size from small executive-style aircraft to larger commercial applications such as the C-9 Nightingale, OSA aircraft fill a niche in theater airlift requirements. The size of the OSA airfleet has always been a source of friction between the combatant CINC's and Congress. The Commission on Roles and Missions of the Armed Forces conducted in 1995 reduced the inventory of OSA aircraft from 551 to less than four hundred. While a 30% reduction may seem significant, OSA utilization was only 10.7% of the total fleet during the height of Operation Desert Storm.[11] In order to optimize OSA usage USTRANSCOM should control the entire OSA fleet. Centralized control will

[11] Office of the Joint Chiefs of Staff, Directions for Defense: Report of the Commission on Roles and Missions of the Armed Forces, 1995, p. 3-21/22.

ensure each combatant command receives equal consideration for use of OSA assets in the future, and provide a pool of assets to supplement operational lift requirements.

Sealift Assets

MSC's sealift shipping, the second leg of the Mobility Triad, is a combination of three fundamental *sources*. First, are those ships operating in the commercial transportation industry that have military usefulness. Second, are commercial ships operating under charter of the Department of Defense. Third, ships that are government owned and usually maintained in reserve status. These three sources also provide the basic types of ships needed to support DoD's mobility mission: container, roll-on/roll-off (RO/RO), and tankers. To a lesser extent, MSC also relies on other types of ships to round out sea mobility capabilities, such as: passenger, hospital, semi-submersible, and auxiliary crane ships.

For deployment purposes, DoD relies on RO/RO vessels to move the majority of forces. However, for more than a decade the commercial industry has advanced in inter-modal operations—specifically containerization—and the proportion of RO/RO ships to container ships in commercial trade is decreasing. Although the DoD has been testing and exercising containerization of military equipment for deployment, the time required to perform load-out functions is unacceptable under the requirements of the MRS. Additionally, containerization places an unnecessary burden upon the theater logistics infrastructure, requiring specialized materiel handling equipment and transportation assets to move the containers forward. "Therefore, to meet the very demanding unit deployment timetables of regional contingencies, it is necessary to [use] RO/RO and similar ships."[12]

[12] Office of the Secretary of Defense, Annual Defense Review, 1996

The MRS also determined that there was a significant shortage in RO/RO capacity to meet surge sealift requirements. The requirements of the ASMP to close a force of five divisions in 75 days, required a vessel that could move a heavy combat force a distance of 8,700 nautical miles (average distance to likely MRC locations) with no more than 15 days spent travelling from port to port.[13] The answer to this shortage came in the form of obtaining 19 Large Medium Speed RO/RO (LMSR) ships. These larger ships however, have deeper drafts than most commercial vessels and increase the reliance on using fixed port facilities in theaters that are often austere and incapable of maturing quickly enough to accommodate a rapid build-up of forces.

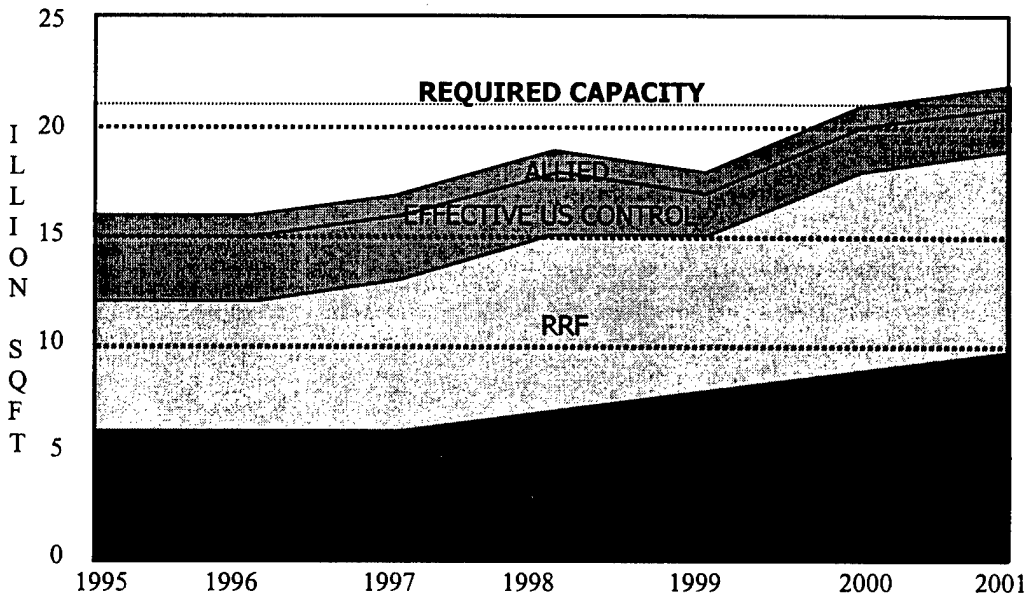

FIGURE 2

The sealift capacity chart at Figure 2 shows current and forecasted contributions to sealift capacity. The LMSR will significantly increase US sealift capabilities by 2001, and beyond. While still capable ships like the Fast Sealift Ship (FSS), will remain an active part

[13] The Army Strategic Mobility Program Video, 1993

of the Ready Reserve Fleet (RRF), the LMSR will increase RRF capabilities by more than five million square feet.[14]

Due to the high operating costs involved with maintaining a fleet of strategic sealift ships, MSC places almost 90% of its assets in reserve status as part of the RRF. The RRF is composed of militarily useful ships maintained in a high state of readiness that DoD can activate within four to thirty days of notice.[15] Long lead times for ship activation must be addressed during operational planning. Although not as responsive as strategic airlift, sealift assets will yield the most "bang for the buck" and provide a theater commander the ability to bring in heavy forces and sustainment in greater numbers.

When a theater has inadequate port facilities or lacks ports altogether, joint logistics over the shore (JLOTS) operations give the US a unique capability to discharge sealift assets across an austere shore. Current JLOTS operations are limited by sea-state (SS) two (one to three foot swells) in the discharge area. The JLOTS joint mission need statement of 1997 identified the need to operate in SS3 conditions (three to five foot swells) in order to meet support requirements for expeditionary type forces. In response to these requirements, the Navy and Army combined efforts to develop a Joint Modular Lighter System (JMLS), capable of performing JLOTS operations in SS3 conditions.[16] However, only unique transportation units have the capability to perform this mission and should be sequenced to arrive early on into the theater of operations to perform JLOTS operations.

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[14] US Department of the Navy, "Navy Fact File", Large Medium Speed ro/ro-T-AKR, <http://www.chinfo.navy.mil/navpalib/factfile/ships/ship-takr2.html>, (4 February 1999)
[15] US Department of Transportation, MARAD Annual Report, <http://marad.dot.gov/report/chone.html>, (4 February 1999)
[16] Joint Modular Lighter System, http://www.acq.osd.mil/at/jmls.htm

Prepositioning

The third and final leg of the Mobility Triad is prepositioning of assets, categorized as either land or sea based. The Afloat Prepositioned Force (APF), composed of three subsets, now encompasses Army, Marine and joint service war materiel afloat near locations of potential conflict. The first group is the Maritime Prepositioning Force (MPF) ships, which carry equipment for a Marine Air Ground Task Force (MAGTF). The second, Combat Prepositioning Ships (CPS), carry equipment for an Army heavy brigade task force. The third group of ships designated Logistics Prepositioning Ships (LPS), carry joint service supplies such as Air Force ammunition and supplies, field hospital equipment, petroleum products, and intermediate aviation maintenance facilities. Off-loading these ships requires either pierside discharge or additional lighterage for over-the-shore discharge. The mix of equipment in the Army's prepositioned ships also includes port opening modules that allow a task force to open a theater for follow-on units.

The current land-based prepositioning program evolved from the stockpiling of materiel in Europe during the Cold War. The resulting mix of prepositioned stocks yielded a "strategically prudent force that is fiscally responsible."[17] Provisions to transport, store, maintain, and stage equipment for use out of land-based locations requires infrastructure development and must support national strategic military objectives. It is the stagnant nature of land-based stocks, however, that make the third leg of the triad a vulnerable target to both conventional and asymmetric threats. Additionally, use of land-based stocks outside of their permanent location requires a significant amount of dedicated lift and personnel to transship to the point of need.

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[17] John M. Collins, ed., Prepositioned Weapons, Equipment and Supplies: Overviews and Evaluations, Congressional Research Service, The Library of Congress, 27 October 1995

Operational planners must completely familiarize themselves with equipment inventories of available prepositioned assets. It is not enough to just know what prepositioned stocks are available. Planners must know requirements to activate stored equipment and limitations of available stocks so forces can bring the right equipment with them when they deploy. Afloat-prepositioned assets can take anywhere from two to four days to offload—when prepositioned off shore. Therefore, planners should also know the method or sequencing of loaded equipment on APF ships. If it would take four days to "dig out" critical supplies from an APF ship, it may be more prudent to have the supplies flown to the theater.

RECOMMENDATIONS

The United States has already laid the groundwork to complete the global mobility mission by 2006, four years ahead of the requirements set forth by JV 2010. However, mobility forces are as technologically perishable as combat forces, and the US must establish procurement programs to continue the modernization of mobility forces beyond 2010. Part of the procurement program must focus on the flexibility offered by strategic insertion directly into the operational level, much like the C-17 offers to today's force structure.

Militarily useful strategic shipping is essential to the movement of heavy forces and follow-on sustainment supplies. The LMSR provides this ability and will carry the US well into the next century. However, larger ships increase the requirement for larger port facilities. Operational planners must ensure adequate facilities exist and/or units capable of conducting in-stream discharge and JLOTS are phased into the deployment timeline early on.

Prepositioning is already capable of supporting Joint Vision 2010's mobility requirements. Afloat prepositioning will provide the necessary flexibility and surge

requirements the US needs to meet two nearly simultaneous MRC's. Early notification is paramount to the responsiveness of afloat prepositioned assets. Force Protection issues must be addressed during the planning process to ensure land-based prepositioned assets remain secure and available to deploying forces.

Theater logistics planners must conduct in-depth analyses of all airfields, ports, and associated infrastructure within their area of responsibility. Full utilization of host nation support assets will refine the requirements for specialized MHE to support the off-load of civil-designed aircraft, and containerized cargo, reducing the amount of lift needed to move equipment into the theater to perform the same function. The theater logistics infrastructure must quickly deploy with the right equipment to off-load mobility assets so surge efforts can maintain the deployment timeline for follow-on forces. Reliance on fixed port facilities may grossly over estimate the contributions of strategic sealift and afloat prepositioned assets. Advancements in JLOTS and procurement of operational lighterage will help secure the ability to off-load shipping assets in austere conditions.

CONCLUSION

Each leg of the Mobility Triad brings with it capabilities and limitations that the operational commander must address. Knowing the capabilities and options available to overcome these limitations will insure full utilization of mobility assets. Operational planners must integrate theater reception forces and specialized equipment into the deployment process, sequencing their arrival early enough to facilitate rapid discharge and turn-around of limited mobility assets. While the US mobility mission remains constant, the operational commander is left with providing the lynchpin for the success of deployment operations.

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NOTE: All Web sites confirmed on 4 February 1999.