# IMPROVING RECEPTION, STAGING, ONWARD MOVEMENT, AND INTEGRATION OPERATIONS FOR THE INTERIM AND OBJECTIVE FORCES

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# ABSTRACT

IMPROVING RECEPTION, STAGING, ONWARD MOVEMENT AND INTEGRATION OPERATIONS FOR THE INTERIM AND OBJECTIVE FORCES, by MAJ Mark T. Simerly, 114 pages.

The transformational imperatives of the interim and objective forces challenge the relevancy of the RSOI model. If RSOI is to continue as a valid construct for the projection of future forces, it must be recast so that it, like the interim and objective forces, gains responsiveness and flexibility while shedding bulk and vulnerability.

This thesis evaluates potential methods to improve the RSOI process for the interim and objective forces in accordance with their emerging employment doctrine and deployment requirements. It addresses the current joint and Army RSOI doctrine and its application to the legacy force in order to evaluate its strengths and weaknesses. The analysis reviews the precepts of the interim and objective forces, underscores the capabilities and vulnerabilities RSOI brings to force projection, and examines how the RSOI functions can be performed more efficiently by addressing the relation of each function to the developing forces.

Due to the wide scope of the research question, the study does not recommend a single solution to RSOI shortfalls, but instead focuses on a collection of possible doctrinal, procedural and organizational solutions, highlighting their advantages and disadvantages.

## ACKNOWLEDGMENTS

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## ABBREVIATIONS

| | |
|---|---|
| AAFES | Army and Air Force Exchange Service |
| AIT | Automated Identification Technology |
| AMC | Air Mobility Command |
| APOD | Aerial Port of Debarkation |
| APOE | Aerial Port of Embarkation |
| APS | Army Prepositioned Stocks |
| C2 | Command and Control |
| CENTCOM | Central Command |
| CRAF | Civil Reserve Air Fleet |
| CSS | Combat Service Support |
| CSSCS | Combat Service Support Control System |
| DLA | Defense Logistics Agency |
| DOD | Department of Defense |
| EAC | Echelons Above Corps |
| EEM | Early Entry Module |
| ELIST | Enhanced Logistics Intratheater Support Tool |
| EMPSS | Enroute Mission and Rehearsal Planning System |
| GCCS | Global Command and Control System |
| GCCS-A | Global Command and Control System-Army |
| GTN | Global Transportation Network |
| HQ | Headquarters |

| | |
|---|---|
| HET | Heavy Equipment Transporter |
| HNS | Host Nation Support |
| IBCT | Interim Brigade Combat Team |
| ISB | Intermediate Staging Base |
| ITV | In-transit Visibility |
| JFAST | Joint Flow and Analysis System |
| JFC | Joint Force Commander |
| JLOTS | Joint Logistics Over-the-Shore |
| JOPES | Joint Operation Planning and Execution System |
| JTAV | Joint Total Asset Visibility |
| JTF | Joint Task Force |
| LSE | Logistics Support Element |
| MHE | Materiel Handling Equipment |
| MOG | Maximum on Ground |
| MSC | Military Sealift Command |
| MSR | Main Supply Route |
| MTMC | Military Traffic Management Command |
| NTC | National Training Center |
| PLS | Palletized Loading System |
| POD | Port of Debarkation |
| POE | Port of Embarkation |
| RF | Radio Frequency |
| RSOI | Reception, Staging, Onward Movement, and Integration |

| | |
|---|---|
| SPOD | Seaport of Debarkation |
| SPOE | Seaport of Embarkation |
| TAA | Tactical Assembly Area |
| TC-AIMS II | Transportation Coordinator's Automated Information for Movement System II |
| TFOP | Theater Force Opening Package |
| TML | Terminal |
| TOFM | Theater Opening Force Module |
| TPFDD | Time Phased Force Deployment Data |
| TSB | Theater Staging Base |
| TSC | Theater Support Command |
| UA | Units of Action |
| UE | Units of Employment |
| ULA | Ultra Large Aircraft |
| USTRANSCOM | United States Transportation Command |
| WPS | Worldwide Port System |

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# CHAPTER 1

# INTRODUCTION

> Force does not exist for mobility but mobility for force. It is of no use to get there first unless, when the enemy arrives, you have also the most men--the greater force.

Rear Admiral Alfred Thayer Mahan, *Lessons of the War with Spain*, 1899

The challenge of transforming today's US Army into the more responsive, more lethal, more relevant force of tomorrow reaches into every aspect of the organization, none more so than force projection. One of the challenges in meeting the future requirements for force projection is bringing the interim and objective force into a theater of operations optimized for immediate action. The process currently used to conduct this final stage of force projection is known as reception, staging, onward movement and integration (RSOI). The question addressed here is, How to transform the RSOI process to meet the strategically responsive goals of the interim and objective force?

## The Research Question

This thesis will examine RSOI operations for objective and interim force deployment. The primary research question is to determine and evaluate methods to simplify and reduce the RSOI process of force projection in order to enable the deployment and operational goals of the interim and objective forces.

The secondary and tertiary questions are as follows:

The first secondary question is, How can the Army reduce and simplify RSOI functions for the interim force in a theater of operations?

**The tertiary questions are:**

1. What measures can be taken to perform or replicate the RSOI processes for the interim force prior to arrival in a theater of operations?

2. How can RSOI requirements be tailored for both opposed and unopposed entry operations for the interim force?

3. How can the Army optimize RSOI functions for both initial entry and follow-on forces of the interim force?

The next secondary question is, How can the Army reduce and simplify RSOI functions for the objective force in a theater of operations?

The tertiary questions are:

1. What measures can be taken to perform or replicate the RSOI processes for the objective force prior to arrival in a theater of operations?

2. How can RSOI requirements be tailored for both opposed and unopposed entry operations for the objective force?

3. How can the Army optimize RSOI functions for both initial entry and follow-on forces of the objective force?

The third secondary question is, What force and equipment design considerations can be implemented to reduce and/or eliminate the requirement for RSOI for the interim force?

The tertiary questions are:

1. What force design considerations can be implemented to reduce and/or eliminate the requirement for RSOI for the interim force?

2. What equipment design considerations can be implemented to reduce and/or eliminate the requirement for RSOI for the interim force?

The fourth secondary question is, What force and equipment design considerations can be implemented to reduce and/or eliminate the requirement for RSOI for the objective force?

The tertiary questions are:

1. What force design considerations can be implemented to reduce and/or eliminate the requirement for RSOI for the objective force?

2. What equipment design considerations can be implemented to reduce and/or eliminate the requirement for RSOI for the objective force?

The fifth secondary question is, How can the use of air and sealift assets be improved to reduce RSOI requirements for the interim force?

The tertiary questions are:

1. How can the use of airlift assets be improved to reduce RSOI requirements for the interim force?

2. How can the use of sealift assets be improved to reduce RSOI requirements for the interim force?

The sixth secondary question is, How can the use of air and sealift assets be improved to reduce RSOI requirements for the objective force?

The tertiary questions are:

1. How can the use of airlift assets be improved to reduce RSOI requirements for the objective force?

2. How can the use of sealift assets be improved to reduce RSOI requirements for the objective force?

By answering these questions in depth, the necessary information to answer the primary research question will be gathered. Intentionally broad in scope, these questions will yield a wide array of possible solutions. They will also yield a wide array of topics to recommend for further study.

## Background

Achieving the interim and objective forces power projection requirements will present the US Army with numerous challenges, one of which is how to effectively conduct the reception, staging, onward movement and integration of units into a theater of operations.

### Reception, Staging, Onward Movement, and Integration

RSOI is a relatively new term for a familiar challenge; namely, receiving deploying personnel and equipment, reforming them as combat units, and integrating them into the theater chain of command (*CALL Newsletter* 1997, 1-2).

After action reviews of Operation DESERT STORM highlighted the challenge of moving large numbers of troops and equipment and reestablishing them as combat ready units. During Operation DESERT STORM, the arrival of units and their equipment could not be accurately forecasted for the theater commander. Units experienced mass confusion as they attempted to separate their equipment from the vast amounts of other unit equipment staged in the ports. Unit movement from the ports to tactical assembly areas (TAAs) was a disorganized event conducted along routes swollen with units attempting to clear the ports. Commanders had difficulty identifying and reporting when their units had achieved combat readiness. The absence of joint doctrine, planning tools, organization and supports systems contributed greatly to the delay of combat power generation.

An indicator of the deployment difficulties encountered during Operation DESERT STORM is the fact that the average combat arms and combat support battalion's equipment arrived on seven vessels over a period of twenty-six days. The average combat service support battalion's equipment arrived on seventeen vessels over thirty-seven days (Joint Pub *4-01.8*, 2000, I-6). Operation DESERT STORM clearly demonstrated the Army's need for improved force closure efficiency. This, in turn, initiated the creation of the RSOI doctrine as a process for more rapidly and efficiently generating unit combat power upon arrival in a theater of operations.

In 1992, the concept of RSOI was introduced in Field Manual (FM) 100-17, *Mobilization, Deployment, Redeployment, and Demobilization.* This manual provided the doctrinal basis for the development of policies for force projection operations. As RSOI doctrine evolved, units began to apply it in the field. Combat Training Centers, led by the National Training Center in Fort Irwin, California, incorporated it into the set of evaluated deployment tasks for rotational units. In forward locations, such as in South Korea and Southwest Asia, RSOI was quickly adopted as a key component in force projection. For example, the Republic of Korea–US Combined Forces Command initiated an annual training exercise focusing on RSOI of strategic deployment forces. This simulation-driven, operational plan oriented command post exercise trains commanders and staffs at division level and above. Also, divisions began to include it in their home station training. By the time RSOI doctrine was codified in FM 100-17-3, *Reception, Staging, Onward Movement, and Integration* in 1999, the doctrine was already solidly integrated into the Army's concept of strategic deployment. The RSOI process has been further incorporated into strategic deployment planning by its adoption by the joint community, as demonstrated by the publication of Joint Pub 4-01.8 *Joint Techniques, Tactics and Procedures in Joint RSOI* in 2000.

RSOI doctrine continued to evolve when the Theater Support Commands (TSCs) were given the responsibility of executing RSOI operations with theater force opening packages (TFOPs). The TSC, a flexible, adaptable organization designed to capitalize on the concepts of modularity and split-based capabilities, allows for augmentation from other services for joint and combined operations. The TFOPs are modularly configured, early-entry multifunctional support task forces designed to accomplish initial RSOI tasks (FM 100-17-3 1999, 2-34).

RSOI has thus become a key element in the Army's ability to project combat power by sea and air to a theater of operations and move forces to places where they will fight to preserve US interests. Although the application of RSOI has significantly improved the generation of combat power for deploying forces, it nevertheless presents a host of problems. RSOI is often referred to as the "Achilles heel" of power projection due to the time and effort required to complete the process. Operational objectives may not afford units the time to "incrementally" generate combat capability and logistics sustainability. Units conducting RSOI and the units undergoing RSOI are extremely vulnerable and require the diversion of combat resources for force protection.

Also, the complicated, split-level nature of RSOI operations must be conducted simultaneous with the planning process for combat operations, thus diverting unit focus from operational missions. This vulnerability becomes especially significant with the likelihood that future adversaries will attempt to deny US forces access to airports and seaports of debarkation (APODs and SPODs) through the use of special operations and weapons of mass destruction. Of course, the longer opponents can delay US forces access, the greater chance for enemy success.

According to Major General James Dubik, the antiaccess threat will require future forces to "deploy quickly, then disperse immediately from their entry points and begin conducting and sustaining their operations. As a result intervening forces will, at the same time be deploying, operating and sustaining--this coordination, like the requirement to use multiple sea- and airports and to operate in underdeveloped infrastructures, becomes a post-Cold War force design criterion" (Dubik 2001, 4).

Army Transformation.

In October 1999, the Chief of Staff of the Army, General Eric K. Shinseki, announced an Army transformation from a legacy force to an interim force that serves as the Army's bridge to the future and to an objective force that uses the best of science and technology to develop a future force that is deployable, agile, versatile, lethal, survivable, and dominant along the spectrum of operations. Shinseki's vision is to be able to deploy one brigade anywhere in the world in 96 hours, one division in 120 hours, and five divisions in 30 days (Shinseki 1999). Key to this operational concept is the necessity of increasing strategic mobility without sacrificing combat power and transitioning to decisive operations without a loss of momentum.

The interim force is a transition force intended to fill strategic near-term capabilities gap. As stated in the *US Army Transformation Campaign Plan*, the goal of the interim force is to be able to deploy a combat-capable brigade worldwide in ninety-six hours in order to conduct immediate "off-the-ramp" operations (*US Army Transformation Campaign Plan* 2001, 9). The interim force must be able to deploy rapidly and conduct decisive large-scale operations much earlier than the legacy force, and to provide decisive initial-entry operations for smaller-scale contingencies (*The Interim Brigade Combat Team Organizational and Operational Concept* 2000, 1-7).

The objective force, as described in the *Army Modernization Plan 2001,* will be designed as a more responsive and deployable force by lighter force design, reduced deployment tonnage, improved force projection platforms, and simplification and reduction of RSOI requirements (*Army Modernization Plan* 2001 13).

In *Joint Vision 2020,* the Chairman of the Joint Chiefs of Staff established the conceptual template for how future US forces will achieve new levels of effectiveness through transformation, and placed a high priority on rapid deployability and early operational effectiveness (*Joint Vision 2020* 2000, 27).

The chart at figure 1 depicts the three components of the Army transformation and the projected timeline for the parallel development of the forces (General Accounting Office, 5).

*The US Joint Forces Command draft publication* Rapid Decisive Operations *states that the future Army force "must not only gain and maintain access to the area of operations rapidly, they must be capable of immediate and sustained action to allow the commander to dominate the conflict environment from the moment of arrival through final destination" (2001, 30).*

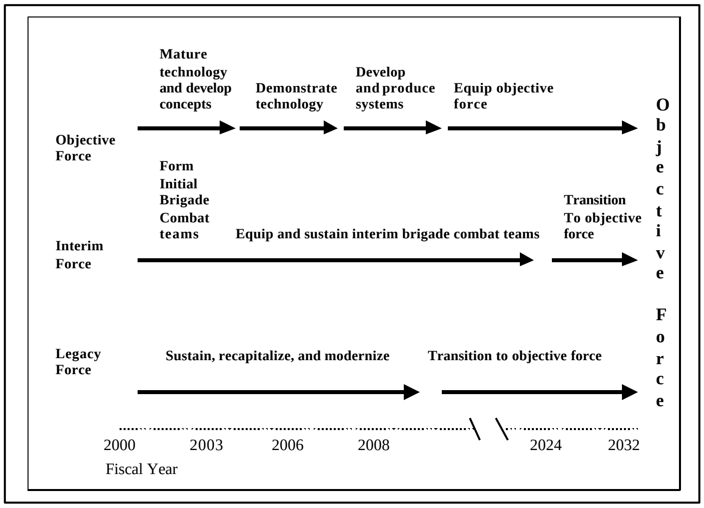


Figure 1. Army Transformation

The desired end state of transformation is an Army force capable of conducting immediate decisive, shaping, and sustaining operations. This transformed Army will also require a revolution in power projection, equipment, and support structure, as well as war-fighting doctrine. The interim and objective forces will call for improved transportation capabilities and smaller, lighter combat forces with diminished sustainment requirements.

Today's force projection strategy requires secure airfields and seaports in the area of operations, secure airlines and sea lines of communication, as well as considerable sustainment stocks. Under future threat scenarios, the denial of US access to an area of operations by attacking the air and seaports will be a key tactic. More and more, operations dependent upon strategic reach will be delayed, shortened in duration, limited in objective, and vulnerable to interdiction. Thus, US forces may no longer have the luxury of performing deliberate, fully resourced RSOI operations.

## Assumptions

In order to continue, certain assumptions must be made to facilitate the thesis research. First, the Army transformation plans for both objective and interim forces will continue, in terms of force design, information technology, strategic lift, and sustainment technology. Second, the assumption that several technological breakthroughs required for the objective force will occur for continuation of research and development must be made for consideration of their impact on force projection. These technological developments will be further described in chapter 4 of the thesis.

The third assumption is that interim forces must deploy within the limits of existing airlift and sealift platforms. In other words, the analysis of interim force projection operations will include only currently available deployment assets. Finally, it is assumed that future adversaries will employ access denial as a counter to US strategic reach capability and as a means to interrupt the deployment flow. Likely methods of denial include diplomatic pressure, threats to allies or coalition partners, manipulation of the media, and direct attacks against APODs, SPODs and arriving units (IBCT O&O 2000, 1-5).

## Definitions

Certain terms fundamental to the research must be clearly defined, most of which have doctrinal definitions. This section not only defines the key terms, but also describes them in detail with regard to their relevance to the question at hand. Because this thesis does not include survey data or operations research or systems analysis data, no quantitative definitions will be required. The terms or concepts described below are listed by order of significance to the topic rather than alphabetical order.

Interim force. The interim force is a transition force that fills the strategic near-term capability gap between legacy force light and heavy units. Organized as a rapidly deployable force, its two core qualities are tactical and operational mobility and decisive close combat capability. Its goal is to deploy a combat capable brigade, an Interim Brigade Combat Team (IBCT), anywhere in the world in ninety-six hours. Organized as a divisional brigade that will typically serve as the "first-to-deploy brigade" under a division headquarters, the IBCT is "preconfigured in ready-to-fight combined arms packages" ready to begin operations immediately upon arrival at an APOD. With its deployability and structure geared to minimize the requirement for RSOI, for the IBCT, the APOD is for all intents and purposes its TAA (*IBCT O&O* 2000, 1-7). The collocation of the APOD and the TAA becomes practically a requirement, however, due to the limited transportation capability of the IBCT's brigade support battalion.

Among its key operational capabilities, the IBCT's 100 percent tactical mobility and capability for intratheater deployment by ground, sea, or C130 air transport place it in a unique category in terms of RSOI requirements (*IBCT O&O* 2000, 1-8). For example, when operating with a heavy division, the IBCT will "almost certainly be the first brigade to deploy, facilitating the arrival and prompt RSOI of the remainder of the division by consolidating and extending the security of APODs and SPODs" (*IBCT O&O* 2000, 1-16). The IBCT is designed to sustain operations for up to 180 days without relief (*IBCT O&O* 2000, 1-8).

While not intended for forcible entry operations, the IBCT will provide an improved, early-arriving capability to immediately begin decisive operations (*Army Modernization Plan* 2001, 14). A training focus based upon the "train-alert-deploy" template similar to that of the legacy force rapid deployment light divisions will enhance the IBCT's responsiveness (*IBCT O&O* 2000, 1-9). This means that the deployment begins once a unit is alerted.

Key design parameters that enhance the IBCT's deployability are restrictions on personnel and logistical footprints in theater, use of common vehicle platforms and reliance upon "reach-back" for functions that can be accomplished out of theater (*IBCT O&O* 2000, 1-12). For sustainment, the IBCT will initially rely upon unit basic loads and strategic configured loads (SCLs) pre-positioned for early arrival in theater, with a capability to sustain itself for seventy-two hours of combat operations. This means that sustainment stocks must be planned into the deployment flow for support of operations beyond seventy-two hours (*IBCT O&O* 2000, 51). Also, due to the IBCT's austere design, follow-on support units may be required for sustainment beyond ten to twenty-one days, ultimately adding to the deployment and RSOI requirements.

The Army currently plans to field five to eight IBCTs in several phases. The first of the IBCTs is slated to be available for deployment in early 2003, with the second expected to be available in 2004. Pending availability of adequate strategic lift, these IBCTs would be available to deploy anywhere within ninety-six hours by 2005 (Gerstein 2001, 1-3).

<u>Objective force</u>. The objective force is a future force designed to be a strategically responsive army capable of dominating across the spectrum of operations and capable of rapid deployment and rapid transition across mission requirements without loss of momentum. Objective force units will conduct operations from "strategic distances . . . arriving at multiple points of entry, improved and unimproved." They will

also arrive “immediately capable of conducting simultaneous, distributed, and continuous combined arms, air-ground operations” (*The United States Army White Paper* 2001, iv). By arriving early, objective forces may deter conflict. If opponents are not deterred, the objective force will retain forcible entry capability (*US Army Transformation Campaign Plan* 2001, 7).

*The White Paper* states that by organizing into smaller, more deployable, more capable formations, “The objective force will exploit military and commercial strategic lift to arrive in theater ready to fight, fully synchronized with other elements of the joint force.” Objective force responsiveness will be characterized by “advanced airlift and high speed, shallow draft sealift capabilities that reduce reliance on improved airfields and seaports and permit multiple entry points, even within austere theaters . . . coupled with some organic capability for self-deployment into the combat zone from operational distances.” New strategic platforms will accelerate force flow, complement use of prepositioned stocks, enable entry operations through multiple points, degrade the adversary’s anti-access strategy, and permit . . . greater flexibility” (*The United States Army White Paper* 2001, 9).

Similar to the interim force, the objective force deployment goal is to move a brigade combat team worldwide within ninety-six hours, position a division on the ground in 120 hours, and five divisions in theater in thirty days. To enable this goal, all systems must be transportable, logistics must be streamlined, and the culture of deployment readiness must be incorporated. The objective force must also be “capable of en route mission planning and rehearsal, exercise of battle command . . . and integration into the gaining theater during movement by air, land and sea” (*The United States Army*

*White Paper* 2001, 9). The Army projects fielding the first objective force units in eight to ten years (Gerstein 2001, 2). Significantly lighter in deployment and sustainment tonnages, objective force units must be deployable by a variety of lift platforms to include C130 equivalent aircraft, ultra fast, shallow draft sealift, and advanced vertical and horizontal airlift *(The United States Army White Paper* 2001, 10).

Entry operations will not rely on conventional APODs and SPODS where access denial is likely. Its rapidly deployable force structure, featuring common platforms, common ammunition, and other components, will have a smaller logistics footprint and smaller sustainment requirements. Consequently, the objective force will deploy fewer vehicles and equipment, and will feature distribution-based logistics rather than echeloned stockpiles of supplies. The objective force units will be able to sustain themselves for up to three days of combat operations and up to seven days for low-end conflict or peacetime operations (*The United States Army White Paper* 2001, 15).

The draft O*bjective Force Operational and Organizational Concept* states that the objective force must have the be able to maneuver over strategic distances, avoiding traditional choke points and predictable points of entry of APODs and SPODs. It also states that the objective force will minimize RSOI requirements by moving "combat ready forces though a flexible network, linking power projection platforms, intermediate staging bases, and new lift platforms that are capable of bypassing traditional ports of entry. . . . Although RSOI functions will continue, ideally, RSOI physical processes may be reduced and eventually eliminated thus ensuring that operational maneuver carries the objective force directly from the projection base to the fight" (O*bjective Force O&0* 2000, 5-6).

The draft O*bjective Force Operational and Organizational Concept* chapter on sustainment also lists the following “Essential CSS Capabilities” that are relevant to the transformation of RSOI (O*bjective Force O&0* 2000, 5-7).

1. Develop the capability to meet the Army force deployment guidelines along with prudent exploitation of commercially contracted aircraft, the Civil Reserve Air Fleet (CRAF) and the Voluntary Intermodal Shipping Agreement.

2. Reduce the weight/cube of systems while increasing survivability and improving deployability.

3. Reduce power and energy requirements by at least one-half.

4. Develop air-transportable platforms capable of being rapidly relocated by in-theater lift assets.

5. Improve reliability and maintainability of systems and platforms by 75 percent, which dramatically reduces unknown battlefield failures through ultra reliability and fail-safe design.

6. Develop a real-time logistics command and control (C2) and distribution management capability, linked to maneuver unit operations that provides situational awareness, total asset visibility, actual and projected consumption rates, and positive control from all sources to the end user.

7. Develop unitized and modularized forces, able to deploy directly into operations with minimal or no RSOI.

8. Reduce reliance on established infrastructures by developing alternative theater opening capabilities.

As the objective force concept is being constructed, units are divided into two types: Units of action (UA) and units of employment (UE). The UA are the tactical warfighting elements of the objective force. UE are the "basis of combined arms air-ground task forces. They resource and execute combat operations; designate objectives; coordinate with multi-service, interagency, multinational and non-governmental activities; employ long range fires, aviation, and sustainment" (*The United States Army White Paper* 2001, 18).

Legacy force. Today's Army, consisting of both heavy and light forces, contains strategically agile light forces that are rapidly deployable, but lacking in mobility, lethality and survivability. Conceived as an opponent of a doctrinally predictable enemy, its heavy forces are characterized by unmatched lethality, mobility, and survivability but are hindered by deployability constraints. Due to high replenishment demands and an inventory of multiple types of equipment, deployed legacy forces generate large logistical footprints, especially for RSOI operations.

RSOI. According to FM 100-17-3, RSOI consists of those "essential and interrelated processes in the area of operations (AO) required to transform arriving personnel and materiel into forces capable of meeting operational requirements (FM 100-17-3 1999, 1-1)."

In the critical entry stage of operations, RSOI is the essential process of receiving military forces, joining them with their equipment, and preparing them for integration into the theater mission. Key to understanding RSOI is the realization that RSOI is not logistics, but operations with significant logistical requirements (CALL Newsletter 1997, 1-2). The first process, reception, is the unloading of personnel and material from strategic transport, marshaling the deploying units, transporting them to staging areas, if required, and providing life support to deploying personnel. This process may take place at seaports or airports of debarkation (PODs) or both (FM 100-17-3 1999, 3-1). As pointed out in Joint Pub 4-01.8, during strategic deployment, the majority of personnel arrive via strategic airlift; and most equipment and materiel is transported via strategic sealift (Joint Pub 4-01.8 2000, IV-1). Under the legacy force, roughly ninety percent of a unit's materiel and equipment arrives by strategic sealift (Joint Pub 4-01.8, 2000, IV-9). A key to the reception process is ensuring that reception capacity is at least equal to strategic lift and delivery capabilities (Joint Pub 4-01.8, 2000, IV-1). The chart at figure 2 depicts the components of reception operations.

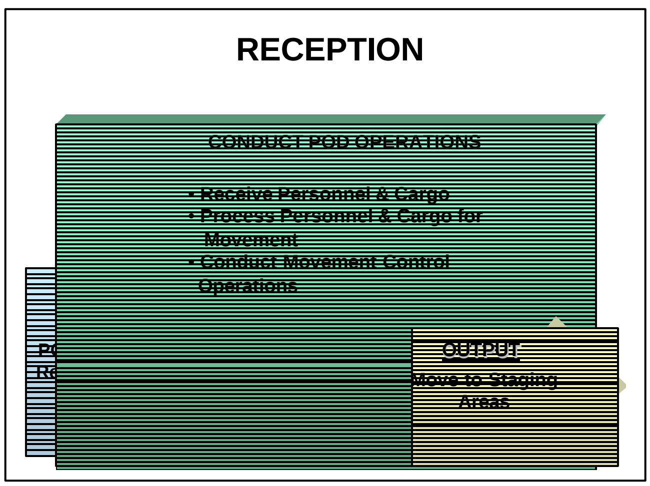


Figure 2. Reception

The second process, staging, is the assembling, holding, and organizing of arriving personnel and equipment in units and forces, incrementally building combat power, and preparing for onward movement and providing life support for the personnel until the unit becomes self-sustaining.  During this phase, units assemble into a mission capable force and units of the force prepare to conduct their missions (FM 100-17-3 1999, 4-1).  Staging is the largest of the RSOI functions in terms of space and support unit requirements because it typically requires extensive facilities for marshalling areas, maintenance, storage, and life support.Staging Areas are preferably established along the lines of communication and contain everything necessary to become mission capable. Units are placed in staging areas corresponding to their follow-on missions.  Also, command and control (C2) is vital to the staging process.  A joint, component headquarters or a combination can be designated as overall in charge of staging operations.  Of course, reliable communications networks with all supported and support units are critical (Joint Pub 4-01.8, 2000, IV-1, V-8).  The chart at figure 3 depicts the components of staging.

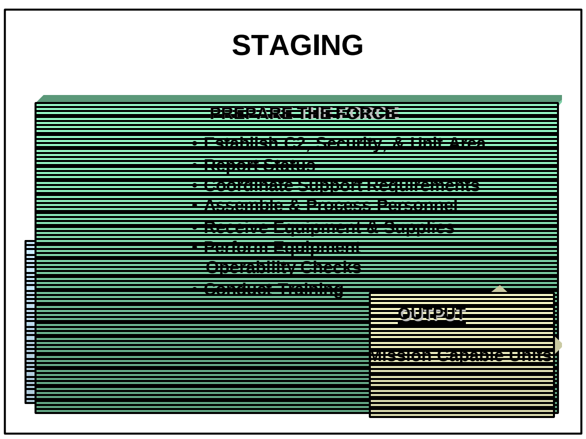


Figure 3.  Staging

The third process, onward movement, is the moving of units and accompanying material from reception facilities and staging areas to TAAs or other theater destinations, moving arriving nonunit personnel to gaining commands, and moving arriving sustainment materiel from reception facilities to distribution sites (FM 100-17-3 1999, 4-1). The critical functions of onward movement are movement control, communications, transportation, supply and services, host-nation support, acquisition cross-service agreements, and force protection (Joint Pub 4-01.8, 2000, VI-4, 5-17). The chart at figure 4 depicts the components of onward movement.

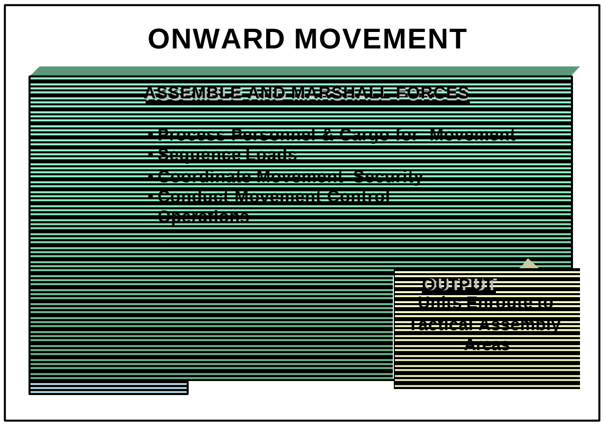


Figure 4. Onward Movement

According to FM 100-17-3, rapid and efficient of onward movement requires "communications sufficient to allow ITV and communications with units in transit, Joint/Multinational procedures to ensure unity of effort and uninterrupted flow, movement control to allow the most effective routes and modes" (FM 100-17-3 2000, 5-17).

The final process, integration, is the "synchronized transfer of authority over units and forces to a designated component commander for employment in the theater of operations" (FM 100-17-3 1999, 6-1). During the integration stage the unit becomes operational and mission-ready by reestablishing internal command and control and meeting the readiness standard determined by the tactical commander.  It must be able to move, fight and communicate at specified levels of capability (FM 100-17-3 1999, 4-1). Additionally, the unit must be absorbed into the joint force, be able to communicate, and receive command and control from its higher headquarters.  Though listed as the last process in RSOI, it can be conducted concurrent with the other processes (Joint Pub 4-01.8, 2000, VII-2).  The chart at figure 5 depicts the three components of integration.

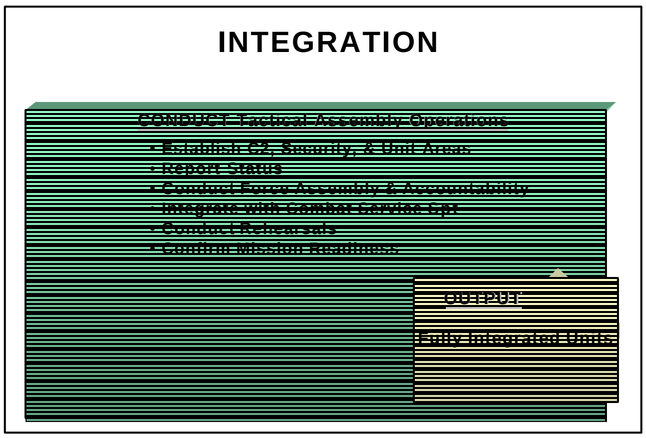


Figure 5.  Integration

Army Principles of RSOI

According to FM 100-17-3, four principles serve as a guide for RSOI's development and execution.  These principles are Unity of Command, Unit Integrity, Optimal Logistic Footprint, and Unit of Effort.  The first principle, Unity of Command, states that a single organization should control and conduct the process so that it can efficiently tailor resources to match deploying forces, provide movement control in the area of operations, and furnish life support to deploying forces.  A single organization is selected to control and operate the entire RSOI process in order to maximize throughput of forces and materiel. The advantages of designating one organization as the RSOI command and control element include avoidance of duplicative effort, waste of resources, and competition for critical facilities. Unity of Command also optimizes use of limited strategic lift and enables reporting of the incremental buildup of combat forces (FM 100-17-3 1999, 2-5).

The second principle, Unit Integrity, directs that the same transportation asset should move unit cargo and personnel as possible, simplifying the force tracking mission and allowing for more rapid force closure.

The third principle, Optimum Logistical Footprint, states that the logistical structure supporting RSOI must match the requirements of the deploying force. The task organization of the structure must be carefully balanced with assets that provide the essential support but do not exceed the support requirement and thus impose a burden on the commander. Also, the sequence of support asset deployment must be timed to allow for suitable assets to conduct RSOI operations immediately.

The fourth principle, Unit of Effort, emphasizes that all facets of RSOI must be consistent with the theater commander's objective. Each process of RSOI must be executed concurrent with the other stages to attain this objective (FM 100-17-3 2000, 1-6).

Joint Principles of RSOI

The joint principles for RSOI differ slightly from the Army principles. Joint Pub 4-01.8 lists the joint RSOI principles as Unity of Command, Synchronization, and Balance. Unity of Command is defined essentially the same as the Army principle.

Balance is similar to Optimize Logistical Footprint, but it also emphasizes that achieving balance requires regulation and integration of both the flow of forces into theater and the intra theater distribution network to allow a continuous and controlled flow of forces and supplies (Joint Pub 4-01.8 2000, viii). Joint doctrine states that balance “is achieved by ensuring that people, equipment, materiel, and information flow are directed at a rate that can be accommodated at every point along the entire network from origin to destination” (Joint Pub 4-01.8 2000, I-5).

Synchronization occurs when personnel and equipment from the same organization arrive either at the same port or at ports that are geographically close together. In order to enhance C2 and maintain unit integrity, supporting elements of RSOI must be coordinated to ensure that the force projection process is not interrupted by rapidly assembling arriving personnel and equipment into combat ready units (Joint Pub 4-01.8 2000, I-6).

Joint Pub 4-01.8 further defines RSOI by listing its essential elements. These essential elements are Command, Control, Communications, Computers, and Intelligence Force Protection, and RSOI Support Organizations. C4I systems allow RSOI providers to locate needed and available units and divert resources to expedite their onward movement. Force protection is the combatant commander’s responsibility to maintain local security in order to preserve tactical and operational flexibility and freedom of action. Also, effective and efficient RSOI operations can become a force protection enabler by reducing force vulnerability through rapid completion of the process (Joint Pub 4-01.8 2000, I-8).

The last joint essential element, RSOI Support Organizations, emphasizes that early deploying units need to be self sufficient in order to support other early arriving units. As other units arrive in the theater of operations, they deploy with minimal self-sustainment capability and may require life support as well as other logistics support. Deployment planners thus need to schedule early arrival of support units so they are operational early enough in the deployment flow to provide essential supplies and services to arriving units. Also, RSOI support units can be reinforced by host nation, allied support, or contract support (Joint Pub 4-01.8 2000, I-9).

Both Army and joint doctrine emphasize the importance of strategic and operational level planning for effective RSOI operations. Integration of planning and execution within the joint community is key to successful RSOI. Also, effective RSOI operations require simultaneous awareness of everything that affects the operation, such as theater infrastructure elements, development of a sequenced Time Phased Force Deployment Data (TPFDD) list, and integrated and reliable communications. Proper planning is required to ensure effective use of soldiers, materiel, and time. Products of this planning include force closure objectives, tactical plans and timetables, strategic lift requirements, and "fort to port" movement timetables (FM 100-17-3 1999, 2-8,9).

Joint Pub 4-01.8 also emphasizes the current systems and processes that enable the efficient conduct of RSOI. Included among these enablers are automated information systems, joint total asset visibility (JTAV), theater distribution, contingency contracting, host-nation support, and training. These enablers can help commanders to conduct movement flow, maintain asset visibility, and ensure balance and synchronization (Joint Pub 4-01.8, 2000 VIII-1).

Deployment. According to Joint Pub 1-02, *DOD Dictionary of Military and Associated Terms*, "Deployment encompasses all activities from origin or home station through destination, specifically including intra-continental, U. S., inter-theater, and intra-theater movement legs, staging and holding areas" (Joint Pub 1-02, 33). In other words, deployment is movement of forces and their sustainment from their point of origin to a specific operational area. The type and nature of deployments vary widely according to scenario and circumstances. Occasionally, strategic deployment may involve the inter-theater movement of forces and materiel using national and allied/coalition strategic deployment capabilities.

Intermediate Staging Base (ISB). A temporary location used to both stage forces and to locate sustainment and maintenance support when anti-access conditions and/or infrastructure in the area of operations preclude early entry. As stated in FM 3.0, *Operations*, ISBs are "typically located within the theater of operations and outside the AO. They are established outside the range of enemy tactical and operational fires and beyond the enemy political sphere of influence. In cases where the force needs to secure a lodgment, an ISB may be critical to success" (FM 3-0 2001 3-56). The chart at figure 6 depicts ISB operations.

ISBs may function as the principal staging base for entry operations. Upon arrival at an ISB, forces perform RSOI and prepare for operations. Threats to entry operations, particularly vulnerable Sea and Air PODs, may require forces to operate through ISBs, where units may transfer from high volume strategic deployment platforms to tactical intra-theater transport better suited for austere, smaller PODs. As noted in FM 3.O *Operations*, "using ISBs is not without a price. Because they are transshipment points, ISBs add handling requirements and can increase deployment time. They may also require infrastructure (personnel and equipment)" (FM 3.0 2001 3-57).

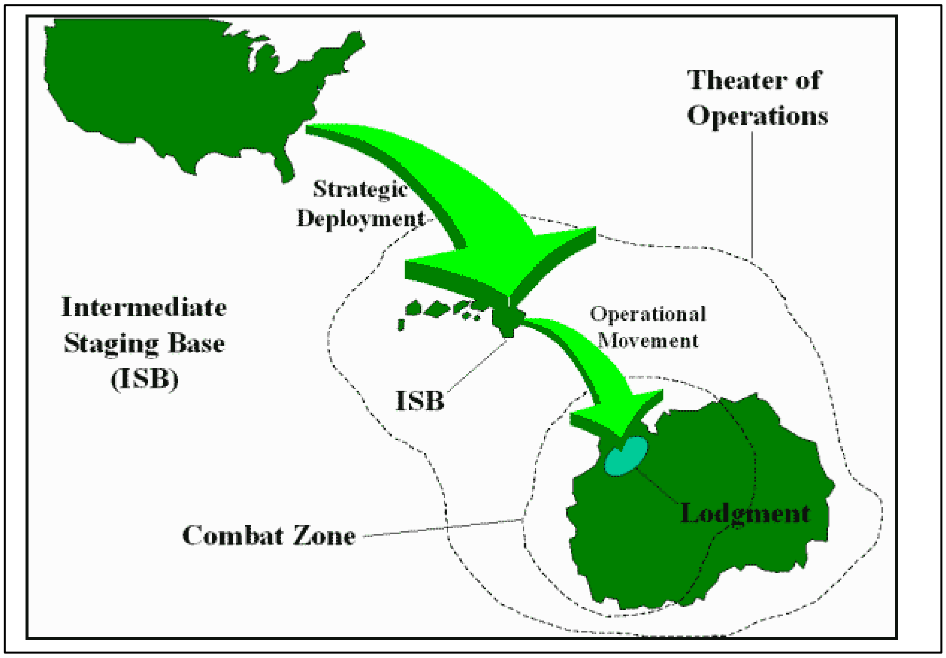


Figure 6. Intermediate Staging Base

ISBs may function as the principal staging base for entry operations. Upon arrival at an ISB, forces perform RSOI and prepare for operations. Threats to entry operations, particularly vulnerable Sea and Air PODs, may require forces to operate through ISBs, where units may transfer from high volume strategic deployment platforms to tactical intra-theater transport better suited for austere, smaller PODs. As noted in FM 3.O *Operations*, "using ISBs is not without a price. Because they are transshipment points, ISBs add handling requirements and can increase deployment time. They may also require infrastructure (personnel and equipment)" (FM 3.0 2001 3-57).

Entry operations. Initial-entry forces typically establish a lodgment and expand it into a support base. In this lodgment, units conduct RSOI, reconfigure, and build combat power. Units entering the theater without opposition, that is, conducting unopposed entry, include Combat Service Support (CSS) forces to establish and support RSOI within the lodgment.

Forcible entry, an offensive operation with the objective of seizing and holding a lodgment against armed resistance, requires units configured for immediate use. As stated in FM 3.0 "forcible entry operations are complex, risky, and always joint" (FM 3.0 2001 3-54). Typically alerted and deployed with hours, operations with simultaneous deployment and combat employment must be meticulously planned and rehearsed. Unlike, the majority of strategic deployments, units and equipment are tailored for immediate use; with critical supplies stored on board. Rapidly obtaining the maximum combat power requires a careful mix of C2, combat, CS, and CSS assets. This requires the strategic lift to place Army maneuver and sustainment forces in theater (FM 3.0 2001 3-54).

Force tracking. According to Joint Pub 1-02, force tracking is "the identification of units and their specific modes of transport during movement to an objective area" (Joint Pub 1-02 2001, 173). Beginning in the staging area, force tracking and provides situational awareness of units within the AOR. Effective force tracking requires communications, data processing equipment, and personnel to provide and manage unit data. Force tracking information can be provided through efficient movement control, and by in transit visibility (ITV) systems. ITV enables commander to track forces by providing locations of units and materiel undergoing RSOI and deployment. ITV also provides support units with arrival schedules of incoming personnel and equipment so they may assemble the required support resources. A variety of systems are being developed that provide visibility of force deployment and sustainment (Joint Pub 4-01.8 2000 4-17- 4-20).

## Limitations

Command and General Staff College Student Text (ST) 20-10, *Master of Military Art and Science (MMAS) Research and Thesis*, defines limitations of a proposed study as "weakness imposed by constraints or restrictions beyond your control as a researcher" (ST 20-10 2001, 20). The major limitation of my study is the lack of published writing on the topic of RSOI with specific regard to interim and objective forces. Although it is mentioned in the *Army Transformation Plan*, and the *US Army Transformation Campaign Plan*, few writings specifically address the subject. There are, however, numerous resources addressing the fundamental aspects of the interim and objective force development that will provide sufficient material to conduct a study of the topic. Another limitation regarding the objective force will be the difficulty or inability to quantify improvements in RSOI efficiency in terms of time or resources due to the as yet undefined force structure and design. In other words, the research will be limited in detail scope by joint and Army documents developed and currently available.

Finally, this research is limited by the unclassified nature of the thesis. Certain aspects of the interim and objective force design are not included due to the classification of the information.

## Delimitations

Command and General Staff College Student Text 20-10, defines delimitations of a proposed study as "constraints that you impose on the scope or content of a study so that research will be feasible (ST 20-10 2001, 20)." Consideration of research will be limited to material prepared since 1991, before the Army transformation campaign was launched but inclusive of Operation Desert Storm and Army Force XXI deployment and logistics initiatives. Material released after 1 January 2002 will not be considered.

In order to prevent the study from becoming an analysis of strategic air and sealift capabilities and requirements, the analysis will focus on the nature and uses of a variety of deployment modes and platforms rather than quantifying them. Also, discussion of RSOI will be restricted to the projection and integration of combat units and will not consider sustainment of the interim and objective forces. Also, although addressed tangentially, the scope of the analysis and discussion is restricted principally to force projection and RSOI of US Army units, not the entire joint, multi-service, combined force that is envisioned in future operations. This limitation will not prevent, however, the consideration of interoperability during the analysis of methods to improve RSOI.

Finally, in order to limit the scope of the study discussion of interim and objective forces will be confined specifically with regard to the RSOI process, and avoid addressing more general force design considerations.

### *Significance of the Study*

The objective of force projection, as defined by FM 3-0, is to conduct "decisive operations so rapidly that the enemy is defeated before he can effectively confront US forces (FM 3.0 2001, 3-40)." Army transformation, which will ultimately produce the interim and objective forces, will lead to a more responsive, deployable, lethal, and survivable force.  The Army's transformation strategy calls for doctrine that will enable the core warfighting capabilities while simultaneously increasing strategic responsiveness.  At the foundation of the transformation's success stands the ability of units to arrive in theater prepared for immediate decisive operations.  RSOI doctrine and capabilities must also be transformed in order to match the goal of projecting the combat power of the interim and objective forces at the decisive time and place.

In order to facilitate the increasingly joint and combined nature of future operations, the transformed RSOI process must be formulated to accommodate joint operations and multi-national forces.  Finally, the RSOI process will continue to support legacy force deployment for a number of years to come.  A by-product of my study may be the identification of measures to improve RSOI for the legacy force.  Although the need to change RSOI is mentioned in Army transformation plans, the methods have yet to be determined or detailed.  This thesis is intended to identify and evaluate some of the possible RSOI transformation methods as a contribution to the discussion, debate and effort Army planners and leaders face as they further develop the interim and objective forces.

# CHAPTER 2

# LITERATURE REVIEW

> When you see a rattlesnake poised to strike, you do not wait until he has struck to crush him. (Dallek 1979, 288)

Franklin D. Roosevelt

## Introduction

This chapter reviews the literature relating to how the Army should transform RSOI for the interim and objective forces. It examines pertinent literature regarding Army transformation for the interim and objective forces, as well as current deployment and RSOI doctrine and lessons learned. Although very little has been published specifically addressing the interim or objective force RSOI per se, the categories above cover related areas or implement parallel aspects of RSOI.

The sources of information discussed below are divided into categories of primary and secondary sources. For the purposes of this literature review, primary sources are considered to be those that are official publications (usually doctrinal publications, such as Army field manuals), those that are fundamental, source documents to the topic at hand, and those that are direct in the sense that they come immediately from an official source. Secondary sources are those sources that use information that has been derived from original, primary, or basic sources. Although an indefinite line divides these two categories, especially with regard to quasi-official documents, this division is the most useful in this circumstance. Internet websites that fit into both categories will be evaluated. This chapter will address sources for Army transformation (the interim and objective force), and deployment and RSOI doctrine.

## Army Transformation

### Primary Sources

Army Transformation is an emerging field. The Army leadership introduced the plan to transform the Army with an interim and an objective force in *The Army Vision* in 1999. Since that time, the purpose and structure of the interim force have been well described in documents, such as the *Army Modernization Plan 2001*. However, no prescriptive operational doctrine for its employment or deployment has been published. Also, because the objective force is still in the conceptual phase, no definitive, detailed descriptions of its design or of its deployment means have been developed. The primary references available regarding interim and objective forces are recent Department of Defense (DOD) publications addressing transformation policy in general terms. Joint documents, such as *Joint Vision 2020* and the US Joint forces Command's *Rapid Decisive Operations* draft, describe transformation requirements in general terms from a DOD perspective. *Joint Vision 2020* presents a long-range view of emerging threats, technologies, and global changes which help define the requirements and capabilities of the future force.

Army publications such as the *Army Modernization Plan 2001, Army Transformation Plan,* and the *United States Army Transformation Campaign Plan,* provide overarching concepts required to develop the interim and objective forces. The recently released *White Paper* also provides a broad description of the objective force concept. Each of these documents addresses future changes in doctrine and force structure. The Organizational and Operational Concepts for the interim and objective forces provide the most descriptive and prescriptive information on employment of these forces. The chapters on sustainment in both O&Os address deployment and RSOI in very general terms.

Other primary sources such as speeches or briefings from Army leadership further describe the interim and objective forces. Examples include General Shinseki's remarks to the annual meeting of the Association of the United States Army in 1999, setting forth Army transformation and detailing the IBCT and IDIV deployment timelines. Also, briefings and talking points from the Association of the United States Army seminar on 8 November 2001 and the Army Transformation Panel on 17 October 2001 elaborate on the objective force concept.

## Secondary Sources

Secondary sources regarding interim and objective forces include large numbers of theses, monographs, and research papers written at military service schools that address Army transformation from a variety of perspectives. Much in this category has already been written about the composition and capabilities of the IBCT, and its support and deployment requirements are fairly well described in a variety of sources. Of course, because the objective force design is still being developed, the analysis focuses on an evaluation of its conceptual principles as outlined in the transformation plans mentioned above. Again, though not specific to the topic of RSOI, these secondary sources provide a framework for analysis and evaluation of the interim and objective forces.

Some of these sources discuss concepts or enablers that add to the viability of transforming RSOI. Some of the works to be referred to include: *Army Transformation and Strategic Maneuver: Future Forces and Deployability Constraints (*Davis, C. 2000*); Boots in the Air: Moving the New Army Brigade (*Smith 2000)*; Logistics*

*Automation Support of Joint Vision 2020* (Hodge 2001); and *"The Army's Twofer:" The Dual Role of the Interim Force*, (Dubik 2001). These and other writings provide the bulk of the recent discussion on transformation needed to successfully answer the primary and secondary question of this thesis.

Additional important secondary sources for research on Transformation include the findings of research agencies, such as the RAND National Defense Research Institute's *Lightning Over Water (*Matsumura et al. 2000*)* and *Ground Forces for a Rapidly Employable Joint Task Force* (Gritton et al. 2000) both of which provide valuable, detailed analysis of deployability. Other useful secondary sources are recent articles in professional journals, such as "U.S. Air Mobility Command and the Objective Force: A Case for Cooperative Revolution" (Owen and Fogle 2001) in the *Military Review*, and "The Army After Next: Revolutionary Transformation" (Reimer and Scales 1999).

## Deployment and RSOI Doctrine

The current doctrine for deployment and RSOI operations focuses on the legacy force. The doctrine, fairly general in scope with regard to RSOI, precedes transformation initiatives and thus does not address transformation. Current joint doctrine on deployment and RSOI is found in *Joint Pub 3-35 Joint Deployment and Redeployment Objectives* (*Joint Pub 3-35* 1999) and *Joint Pub 4-01.8 Joint Tactics, Techniques and Procedures for Joint RSOI.*

Army deployment doctrine is described in *FM 100-17 Mobilization, Deployment, Redeployment, Demobilization; FM 100-7-4 Deployment*; *FM 100-17-5 Redeployment*; and *FM 100-17-1 Army Pre-positioned Afloat Operations*. The doctrinal framework of the RSOI process is thoroughly described in *FM 100-17-3 Reception, Staging, Onward Movement, and Integration*. This manual also provides background discussion of the development of the RSOI doctrine as the U.S. Army changes its fundamental posture from forward deployment to power projection.

Beyond this definitive document, there are other sources detailing the RSOI process as it has been applied to the legacy force, particularly lessons learned documents available from the Center for Army Lessons Learned (CALL), such as *CALL Newsletter No. 97-7, Reception, Staging, Onward Movement and Integration* Feb 97. After action reviews from operations and exercises such as Operation ALLIED FORCE, Operation JOINT ENDEAVOR, JOINT GUARD, Operation DESERT THUNDER also provide valuable perspective on RSOI for the legacy force (CALL Newsletter 1999).

## Secondary Sources

Secondary sources regarding RSOI include a limited number of theses, monographs, and research papers written at military service schools addressing deployment and RSOI such as *Enhancing the Army's Strategic Deployability (*Shoffner 2000)*, RSOI: Force Deployment Bottleneck* (D'Amato 1998)*, RSOI and the IBCT – Relevancy in Future Deployment Operations* (Croft 2001), and *Infrastructure, the Fourth Element of Strategic Mobility* (Gardner 1996). Additional secondary sources discussing deployment include articles and studies such as the Institute for Defense Analysis's *Recommendations for Improving Joint RSOI; Doctrine, Organization and Systems for Reception, Staging, Onward Movement, and Integration* (Institute for Defense Analyses 1996), and *Doctrine, Organizations* and *Systems for Reception, Staging, Onward Movement, and Integration (RSOI) Operations* (Institute for Defense Analyses 1997).

Other secondary sources regarding RSOI and related topics are found in the form of articles such as "The Right Force for the Battle: The Theater Support Command"(Blair 2001).

Other Sources

The keystone reference for Army operations, FM 3-0 *Operations,* was published in June of 2001, and serves as a fundamental reference for discussion of force projection operations for legacy, interim and objective forces. DOD agencies providing information regarding ongoing development and analysis of transformation and RSOI include the Transformation Force Task Force, Training and Doctrine Command (TRADOC), the US Army Combined Arms Support Command, and the Deployment Process Modernization Office. Private and quasi-official sources agencies such as the RAND Corporation's National Defense Research Institute and AUSA's Institute for Land Warfare also provide analysis on RSOI and transformation. Most of these DOD and non DOD agencies operate websites as sources of information, such as the DOD site, DefenseLink (http://www.defenselink.mil/specials/transform/), TRADOC (http://www.army experiment.net/), Fort Lewis, home of the first IBCT (http://www.lewis. army.mil/transformation), the Institute of Land Warfare (ILW) http://www.ausa.org/ilw), the DPMO (http://www.deploy.eustis.army.mil) the Institute for Defense Analyses (IDA) (http://www.ida.org/), and the RAND Corporation (http://www.rand.org/publications/ electronic/).

Also, an on-line bibliography entitled "Army Transformation" is available on the U.S. Army War College (USAWC) library home page (http://carlisle-www.army. mil/library/). The TRADOC, DPMO, the objective force task force websites all provide convenient access to primary documents, such as field manuals, joint publications, briefings, and O&O. The ILW, IDA, and RAND websites provide access to current briefs, defense reports, issue papers, and studies.

## Summary

The primary and secondary references identified above provide sufficient material to conduct this research. The references discussed describe the types of sources currently available to shed light on the topic of RSOI for the interim and objective forces. RSOI has been well defined by doctrine and tactics, techniques, and procedures. It has also been well evaluated by after-action reports. Due to the interest in Army transformation, a significant amount of recent writing, both primary and secondary, has been brought to bear on the subject of objective and interim forces. The limits of strategic deployment have also been the topic of much discussion in military sources, such as transformation plans, professional journals, and academic writings. Combining the discussion of Army transformation for both the interim and objective forces with the current joint and Army doctrine and lessons learned yields insight as to how future RSOI processes should be conducted.

CHAPTER 3

# RESEARCH DESIGN

Knowledge is more than equivalent to force. (Bartlett, 1919, 57)

Samuel Johnson

## Introduction

This chapter outlines the methodology used to conduct this study of the Army processes, and the joint processes as they apply to the Army, for conducting RSOI. It explains the method for analyzing current literature with respect to three questions: (1) How can the Army reduce and simplify RSOI functions for the interim force and objective force in a theater of operations? (2) What force and equipment design considerations can be implemented to reduce or eliminate the requirement for RSOI for the interim force and objective force? and (3) How can the use of air and sealift assets be improved to reduce RSOI requirements for the interim force and objective force? This chapter also outlines how current DOD, joint, and Army plans, doctrine, regulations, policy, and guidance will be used to provide the foundation for some proposed answers to these questions. Finally, it demonstrates how the latest experience and work in the field of RSOI can be applied to improve or, at least, refine RSOI processes.

## Description of the Study

This study determines the steps required to improve the RSOI process for the interim and objective forces with respect to the emerging employment doctrine and deployment requirements of those units. It addresses the current joint and Army RSOI doctrine and its application to the legacy force in order to evaluate its strengths and weaknesses. The analysis reviews the precepts of the interim and objective forces, underscores the capabilities and vulnerabilities RSOI brings to force projection, and examines how the RSOI functions can be performed more efficiently by addressing the relation of each function to the developing forces.

Using this evaluation as a starting point, the study examines potential methods for improving RSOI from the perspective of interim and objective employment, judged by the criteria of feasibility, acceptability, suitability, and interoperability. Due to the relatively wide scope of the research question, the study will refrain from recommending a single solution to shortfalls, but will instead focus on increasing awareness of the problem and providing a collection of possible solutions, highlighting their advantages and disadvantages through analysis.

## Research Analysis

The research analysis for answering the primary and secondary questions will include elements of descriptive and comparative analysis. It will analyze and assess current RSOI procedures and will develop and discuss some new models for improvement of the RSOI processes. By examining each RSOI process independently, the study will establish a set of distinct and separable solutions.

Answering the research question requires the attainment of scientific knowledge. The two principal methods of acquiring scientific knowledge are deduction and induction. Deduction relies upon observations based on prior expectations or theories. The approach is frequently used to substantiate a hypothesis. In contrast, induction relies upon the evolution of theory from observations, requiring objective observations. The observer detects patterns in the observations to formulate a theory (Jones and Olsen 1996, 8). Because there is no existing theory to support the research question and the thesis is not based upon a hypothesis, the inductive method will prove to be the most useful.

The thesis strategy is to first research primary sources on US Army transformation (official DOD documents and briefings) and primary sources on deployment doctrine (Joint and U.S. Army publications). Second, research of secondary sources (articles from professional journals and academic writings) that address various aspects of the interim and objective forces, with particular emphasis on deployment and force projection are addressed. Third, primary sources from DOD agencies are examined in order to determine if there are any unpublished plans for transformation that bear on the problem of RSOI.

From all of these sources, possible solutions to the problem question are identified and evaluated and secondary questions refined. Based on all of the research, methods for optimizing the RSOI process for the interim and objective forces are determined. These methods are then evaluated, using the interim and objective force criteria, to ensure that they are feasible, acceptable, suitable, and interoperable.

## Evaluating the RSOI Concepts Using Feasibility, Acceptability, Suitability (FAS) and Interoperability Criteria

Military planners employ FAS criteria for evaluating strategy. The FAS criteria are an accepted means of testing courses of action, according to Joint Pub 3.0. This study will use a tailored set of FAS criteria to test the viability of methods to improve RSOI. Essentially, FAS criteria serve as a filter, eliminating ways that are not feasible, acceptable, or suitable.

In order to establish a basic understanding of the FAS criteria, each FAS criterion is defined based upon common usage and then as applied to RSOI. The source for these definitions is an article discussing military strategy by Lieutenant Colonel Ted Davis, USA (retired), "Evaluating National Security Strategy and National Military Strategy" (Davis, T. 2000). The definition of each FAS criterion is as follows.

Feasibility is defined as an assessment of the concept given the resources available. Based upon comparative resources, feasibility considers friendly capability versus threat capability given the nature of the environment. A test for feasibility is primarily a military evaluation requiring both intuitive and experiential skills on the part of the evaluator. A key consideration of feasibility pertaining to RSOI for the interim and objective forces is whether proposed solutions can be accomplished.

Acceptability examines the issue of cost: Are the consequences of cost justified by the importance of the effect desired? Acceptability considers both tangible (e.g., dollars and personnel) and intangible costs (e.g., prestige and public support). For a concept to be considered "acceptable," it must also be consistent with the operational concepts of the interim and objective forces. As with the previous case, determining acceptability involves a combination of art and science. Key RSOI considerations of acceptability are cost, vulnerability, timeliness, and resources.

A military objective is considered "suitable" if its attainment will accomplish the desired effect. The terms "suitability" and "adequacy" are virtually interchangeable. Joint Pub 1-02 defines adequacy as the "determination whether the scope and concept of a planned operation are sufficient to accomplish the task assigned." This definition will be used for suitability in the context of this study. The suitability test requires mostly intuitive skills because it frequently involves translating intangible political objectives into tangible military objectives. A key RSOI consideration of suitability is the extent to which a given solution improves the speed and efficiency of the RSOI processes.

The last criterion to be used is interoperability. Joint Publication1-02 defines interoperability as the "ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together."

Interoperability is the foundation of effective joint, multinational, and interagency operations. The joint force has made significant progress toward achieving an optimum level of interoperability, but there must be a concerted effort toward continued improvement. Further improvements will include the refinement of joint doctrine as well as further development of common technologies and processes. Exercises, personnel exchanges, agreement on standardized operating procedures, individual training and education, and planning will further enhance and institutionalize these capabilities. Interoperability is a mandate for the joint force of 2020--especially in terms of communications, common logistics items, and information sharing. Information systems and equipment that enable a common relevant operational picture must work from shared networks that can be easily accessed by appropriately cleared parties.

As stated in *Joint Vision 2020,* "Although technical interoperability is essential, it is not sufficient to ensure effective operations. There must be a suitable focus on procedural and organizational elements, and decision makers at all levels must understand each other's capabilities and constraints. Training and education, experience and exercises, cooperative planning, and skilled liaison at all levels of the joint force will not only overcome the barriers of organizational culture and differing priorities, but will teach members of the joint team to appreciate the full range of Service capabilities available to them" (*Joint Vision 2020* 2000, 21).

Some features of interoperability for RSOI include: a common doctrine, or set of guidelines, for planning, executing, monitoring, and assessing joint and coalition operations; technological cooperation on research and development programs; joint procurement of weapons systems and logistics equipment; regular training exercises to coordinate joint and combined operations, and planning within the U.S. Army itself to coordinate interoperability efforts. Also, interoperability for the RSOI process will both enhance capability and reduce costs by leveraging assets. In order to limit the scope to the study, the analysis will focus on joint rather than combined interoperability,

In sum, after identifying areas where in RSOI doctrine and execution as applied to the transformational goals of the interim and objective forces can be improved, the analysis will apply inductive reasoning to evaluate possible methods to transform each function of RSOI by applying the criteria of feasibility, acceptability, suitability, and interoperability. Applying each of the evaluation criteria will not render a simple "yes or no" answer, rather the criteria will or will not be satisfied at varying levels. Discussion and analysis of these levels of satisfaction is the heart of the next chapter, Analysis.

## CHAPTER 4

## ANALYSIS

> We must disenthrall ourselves. . . . As the times are new, so must we think anew.
>
> Abraham Lincoln, *Collected Works of Abraham Lincoln*

### Introduction

RSOI is a critical component of deployment operations. It assembles deploying personnel, equipment and accompanying supplies into mission capable forces. Legacy forces, other than those conducting forced entry operations, arrive separately–personnel by air and equipment and supplies by sea. As they arrive in a theater of operations, they are in effect passengers and cargo with no combat or self-sustainment capability. RSOI is the process that transforms those passengers and cargo into mission capable units.

The transformational imperatives of the interim and objective forces challenge the relevancy of the RSOI model. Interim and objective force units must arrive in theater ready to fight off the ramp. Today's lock-step method of building combat power incrementally through RSOI is inconsistent with the employment goals of both the interim and objective forces. If RSOI is to continue as a valid construct for the deployment of future forces, it must be recast so that, like the interim and objective forces, it gains responsiveness and flexibility while shedding bulk and vulnerability.

In order to determine and evaluate methods to simplify and reduce the RSOI process for the interim and objective forces, one must examine the efficiency of the RSOI process as it has been applied to the legacy force. Evaluation of the past performance of the RSOI processes yields lessons to sustain and to improve RSOI doctrine and execution.

Analysis of the secondary and tertiary questions in depth assembles the necessary information to resolve the primary research question, which is to determine and evaluate methods to simplify and reduce the RSOI process in order to enable the deployment and operational goals of the interim and objective forces. Answers to the secondary and tertiary questions yield a wide array of possible solutions, as well as a wide range of topics to propose for further study.

RSOI Lessons

Since Operation Desert Storm, the Army has made significant strides in increasing its strategic responsiveness. An important change in force projection has been the development of RSOI doctrine, its adoption by the joint community, its application in training venues. The benefits of the RSOI concept were advanced by its official introduction into the joint lexicon so that joint doctrine included a consistent RSOI terminology (IDA 96, 22). The recent development of the TSC has also meant an enhanced responsiveness. In addition, new prepositioning sites built in places such as Kuwait and Qatar have improved strategic responsiveness. More equipment was placed in unit sets on prepositioned transport and roll-on/roll-off (Ro/Ro) ships. New deployment platforms such as the Large Medium Speed Roll-on/Roll off (LMSR) ship and the C-17 transport aircraft were fielded.

The Army also dedicated more than $800 million to improve the infrastructure and deployment enablers of the continental United States power projection installations. It procured nearly 11,000 new railcars for prepositioning at these installations, as well as ammunition plants and depots. Additionally, the Army bought over 2,500 new containers for early-deploying units and procured nearly 13, 000 container roll-in/roll-out platforms (CROP) (Association of the United States Army 2001, 1-2). Despite these measures, units of the legacy forces still present a daunting deployability challenge. Table 1 shows the airlift and sealift requirements of legacy force units. It is notable that the infantry (airborne) division, supposedly the Army's most deployable, still requires about two weeks to deploy in its entirety by air under the most optimal circumstances (Davis, T. 2000, 5).

Table 1. Deployability of Army TOE Combat Units (Davis, T. 2000, 5)

| **ARMY UNITS** | **SHORT TONS (K STON)** | **SQUARE FEET (K sq ft)** | **Sealift** ***LMSR**** | ***Sealift*** ***RRF. RORO***** | ***Airlift*** ***C-17 Missions*** |
|---|---|---|---|---|---|
| **Divisions** | | | | | |
| Light Infantry Division | 17.8 | 548 | 2.1 | 4.4 | 549 |
| Light (Airborne) Division | 24.8 | 908 | 3.4 | 7.2 | 667 |
| Airborne (Air Assault) Division | 34.3 | 1056 | 4.0 | 8.4 | 1027 |
| Infantry (Mechanized) Division | 93.6 | 1460 | 5.5 | 11.6 | 1898 |
| Armored Division | 97.3 | 1447 | 5.5 | 11.5 | 1936 |
| Heavy Force XXI Division | 86.8 | 1411 | 5.3 | 11.2 | 1780 |
| | | | | | |
| **Regiments** | | | | | |
| Armored Cavalry | 29.9 | 411 | 1.6 | 3.3 | 578 |
| Light Armored Cavalry | 11.4 | 300 | 1.1 | 2.4 | 310 |

*Average capacity=264,000 square feet
**Average capacity=125,600 square feet

The performance of RSOI operations to speed deployment and employment has been tested in several operations since Desert Storm. Operations JOINT GUARD, JOINT ENDEAVOR, and ALLIED FORCE each demonstrated important shortcomings of RSOI doctrine and organization. During Operation JOINT GUARD the RSOI operations required extensive POD support. For example, once personnel arrived at a POD, they required transportation and life support until they were prepared for onward movement. This was exacerbated by loading restrictions for airlift and sealift that required equipment to be loaded with empty fuel tanks, thereby requiring fuel immediately upon arrival in theater (CALL 99-17, II-2).

Operation JOINT ENDEAVOR illustrated the point that RSOI units must be staged at a POD early in order to reconnoiter, prepare support areas and rehearse. RSOI support units required extensive supply, life and transportation support, as well as construction capability. These requirements increased the competition for sea, air and ground lift for early arriving units and, in turn, added to in-theater sustainment requirements. Support units also needed additional force protection, typically provided by combat arms and combat support units, once again increasing the number of deploying units, and sustainment requirements. In this fashion, RSOI generates its own set of deployment and sustainment requirements, none of which directly support the theater commander's operational mission (CALL 99-17, II-3).

The reception and staging of Task Force Hawk presented numerous challenges in infrastructure, ITV, and cargo processing. Task Force Hawk, designed to complement the North Atlantic Treaty Organization deep operations capabilities during Operation ALLIED FORCE, deployed into Albania to conduct operations over Kosovo. It encountered significant problems in deploying to its assembly area in the vicinity of Tirana, Albania, due mostly to the austere facilities of Albania. Its APOD, Rinas Airport, also served as the Theater Staging Base (TSB) and TAA. Rinas had an extremely limited maximum on ground (MOG) capability (the number of parked aircraft that can be loaded or unloaded simultaneously), and it served as a regional refugee center, further limiting the space for the airflow of Task Force Hawk (CALL 01-5, I-1).

Reception operations for Task Force Hawk did not suffer from a shortfall of available aircraft, but were limited in the availability of airports. The MOG at Rinas restricted the inbound flow of aircraft, thus creating a deployment backlog. Also, Task Force Hawk had to compete for aircraft loading and unloading as well as other airfield resources because the airfield was split between the Humanitarian "Shining Hope" operation and the Task Force Hawk operation. As a result, the MOG for Task Force Hawk was merely three aircraft for deploying forces and for sustainment. Also, Task Force Hawk had difficulty maintaining visibility over in-bound soldiers, equipment, and supplies because the automated systems commonly used for this purpose were unavailable due to either fielding changes or lack of connectivity. Therefore, the Army forces on the ground at Rinas did not receive ITV information and thus could not rapidly match equipment and supplies with troops (CALL 01-14, 4).

The staging of Task Force Hawk was hampered by poor infrastructure and limited space for cargo processing and unit staging. Poorly surfaced roads within the TSB slowed delivery of unit equipment. Restricted space for cargo processing hindered materiel handling and delayed loading and unloading. The staging area for inbound, outbound and frustrated cargo was an area confined to 100 by 100 meters. Units were staged in locations that could not geographically support their operation because of space constraints and muddy terrain (CALL Newsletter No. 01-14, 1 Aug 01, 4). Contributing to the delay in the deployment of Task Force Hawk was the inadequate deployment training of its units. The deploying units of Task Force Hawk were poorly trained in joint inspection and air movements standards, detracting from the efficiency of the deployment (CALL Newsletter No. 01-5,), 2001, I-1).

A common trend in all of these operations is that units experienced delays in RSOI due to lack of asset visibility. Poor asset visibility of inbound units and equipment slowed reception by chocking ports and preventing proper marshalling of support assets, such as MHE. Lack of asset visibility also impeded onward movement by contributing to the misallocation of inland transportation assets. Also, once forces and equipment arrived, asset visibility in a theater of operations becomes challenged by competing demands for communications and transportation assets (Deployment Process Modernization Office 2000, 5-1).

Appendix 1 shows tactics, techniques and procedures for RSOI gathered from these operations. They provide an example of the kind of planning, deployment and execution challenges that RSOI has come to represent.

Reviewing the performance of RSOI operations of the past decade reveals that, the transformational imperatives of the interim and objective forces require a more efficient means of establishing combat power in a theater of operations. Although force projection in general and RSOI operations in particular have produced significant gains in the efficiency of deployments, the logistical footprint required for deliberate RSOI operations is unacceptably large, driven by a "complex inventory of multiple types of equipment" and unrealistic replenishment demands (*Strategic Mobility and Responsive Power*, 15). RSOI has become the "narrow end of the funnel" when measuring the ability to project combat ready units to theater commanders. The cost of RSOI operations is high in time and lift. It is also personnel and resource intensive, necessitating a theater support structure in place prior to the arrival of deploying forces to prevent congestion, backlogs, and an absence of essential life and logistics support.

Given the Army's transformation goals, RSOI as known and practiced today will not support the intent of future interim and objective force commanders. How then to refocus, refine or refit RSOI doctrine and capabilities so that it is consistent with the mandate of the transformational Army? Can RSOI be reduced or even eliminated as the architects of the objective force suggest? The answer lies in innovations and enablers of RSOI doctrine and execution, force and equipment design of interim and objective force units, and improvements in the employment of strategic and theater airlift and sea lift. First to be considered in this analysis are the methods of reducing RSOI through innovations and enablers. The interim force will be examined first, followed by the objective force. Although treated separately, the interim and objective forces overlap considerably in application of methods to improve RSOI. In those instances where the methods can be applied equally to both forces, it will be noted.

Reducing RSOI Functions for the Interim Force

How can RSOI functions for the interim force in a theater of operations be reduced? The interim force is designed to serve as an early entry, air deployable, full spectrum combat force. It is intended to deploy worldwide within ninety-six hours prepared for immediate operations (IBCT 0&0 2000, 1-1). In order to be prepared for immediate employment, the IBCT must deploy in combat configuration, leading many observers to presume that RSOI operations are unnecessary. The IBCT as currently designed requires personnel and equipment to receive the aircraft, unload (if sustainment stocks are palletized), and to provide security. Such RSOI operations may be reduced, however, by actions taken prior to arrival in a theater of operations, and for techniques and enablers for opposed and unopposed entry, and for initial and follow-on forces.

Reducing the interim force RSOI requirements prior to arrival

What measures can be taken to perform or replicate the RSOI processes for the interim force prior to arrival in a theater of operations? One approach is to perform as many of the RSOI functions as possible before a unit arrives in a theater of operations. This may initially seem counterintuitive (how can a unit be received if it hasn't arrived?), but by performing some of the RSOI steps before or during deployment, the workload upon arrival can be significantly reduced. Of course, this concept is far from new. For instance, the Army's rapid deployment units prepare for immediate deployment and employment with combat loading and training. These techniques alone, however, are not enough for the heavier force structure of the IBCT. Several additional techniques and enablers might provide the front-end efficiencies needed to significantly reduce RSOI. Techniques to be considered here are combat loading, use of strategic and combat configured loads, and training. Enablers include en route mission planning and rehearsal system (EMPPS) and the Joint Flow and Analysis System for Transportation (JFAST), ITV, and strategic and theater configured loads (SCLs and CCLs).

Units have historically been divided into deployable pieces and placed on strategic lift in order to maximize use of the lift available (Croft 2001, 38). The practice of administrative loading of strategic lift based solely on the efficiencies of loading equipment often results in platforms arriving in theater containing equipment from several units, necessitating the time and effort in theater to process the equipment into unit sets. This practice forces units to reconfigure into discrete units upon arrival in theater. This reconfiguration, and the associated costs of receiving and staging the disconnected unit, is inconsistent with the interim force employment concept. Under the concept of combat configuring units, they are allowed to maintain unit integrity, are uploaded with their unit basic loads of ammunition, fuel, food, water and other supplies, and have their communications equipment operational. Soldiers and vehicles travel with their weapons.

Deploying units in combat configuration reduces the need for reception and staging by eliminating the need to marshal vehicles and personnel separately and to receive, stage, issue or distribute supplies. Materiel handling equipment and in-transit visibility requirements are also reduced. Units can more easily perform onward movement with organic assets if they arrive combat loaded. The integration of units is essentially complete once units establish communications with themselves and the theater command with their uploaded communications equipment. Deploying in combat configuration is consistent with the RSOI principle of Unit Integrity, which emphasizes the advantages in force closure and force tracking gained by maintaining unit integrity (FM 100-17-3 1999, 1-20).

Deploying in combat configuration, however, may reduce the efficiency of lift assets because it equipment and personnel are not necessarily loaded according to the most efficient use of space. Many platforms will move at less than capacity, because to load them fully would cause the splitting of a unit. Such inefficiency reduces the feasibility of this option, but because the deployment bottleneck is usually in POD throughput rather than available lift, the advantages gained would generally outweigh this advantage.

In terms of acceptability, a drawback to deploying in unit configuration is the issue of compatibility of uploaded ammunition and fuel. Uploaded vehicles are not only heavier loads, but they are also more volatile from a safety standpoint. This affects interoperability, as well, because the other services are reluctant carriers of equipment fully loaded with fuel and ammunition. Nevertheless, the suitability of combat loading in terms of operational and tactical flexibility can overcome such constraints if load plans are properly prepared and secured. The net weight of combat loaded vehicles must be included as an equipment design factor in order to ensure compatibility with transportation platforms.

An initiative to reduce integration time and support is to conduct mission planning and rehearsal while en route to a theater of operations. The En Route Mission Planning and Rehearsal Planning system (EMPPS) being developed by the Defense Advance Research Projects Agency is intended to give deploying units the capability to continue planning and receive intelligence updates while en route to an area of operations (Croft 2001, 40). Integration is considered to be complete once a unit becomes operational and mission ready, able to communicate, and when the receiving commander establishes positive control over the arriving unit, usually in the TAA. To shorten the time required for integration, planning and coordination must occur early in the force projection process. Significant efficiencies in time and resources can be gained if this can be accomplished before and during the deployment phase by rapidly integrating forces on the front end and conducting planning and rehearsals en route. Assured communications is one of the precepts of the IBCT. If communications en route are assured, units with the proper enablers can conceivably enter the theater fully integrated.

The Joint Flow and Analysis System for Transportation (JFAST) is a multi-modal transportation analysis tool designed for the U.S. Transportation Command (USTRANSCOM) and the joint planning community. JFAST is used to determine transportation requirements, perform course of action analysis, and project delivery profiles of troops and equipment by air, land, and sea. JFAST can provide rapid transportation feasibility analysis from multi-modal origins to POD. Using JFAST an operator can rapidly create a TPFDD to evaluate a course of action for transportation feasibility. JFAST, however, does not track actions from the POD to the TAA (RSOI) for full "end to end" capability. To accurately assess the support needs of a theater, planners need automated decision support tools to establish, modify, and monitor the flow of forces into the theater and beyond the POD.

The capability to conduct end-to-end transportation analysis would support the power projection goals of the objective force by including TPFDD development as a key part of the commander's planning process. End to end analysis capability is consistent with the Institute for Defense Analyses recommendation that joint planners should assess the capability of a planned theater LOC to conduct RSOI in accordance with a commander's requirement prior to a deployment plan being deemed feasible (IDA 1996, 25). By modifying JFAST or the enhanced logistics intratheater support tool (ELIST) to accurately forecast RSOI operations and evaluate capability of theater lines of communication to conduct RSOI, the requirements for RSOI can be more precisely tailored. Also, if JFAST or a similar planning tool is linked to global transportation network systems to provide real-time RSOI "replanning capability" during execution of deployment, it could reduce the footprint of RSOI support units and add to the theater commander's flexibility (IDA, 1997, 15).

The feasibility of implementing an end-to-end capability planning tool is enhanced by the fact that capable systems such as JFAST currently exist and only need to be updated. The costs of development would also be acceptable, especially compared to the costs of inefficient deployment operations. It would be suitable to the task of reducing RSOI by improving port throughput. By modeling RSOI operations in the planning stage, JFAST permits effective planning of reception and staging by identifying port capabilities and matching with the support requirements for each unit arriving at a POD (Meyer 2001, 5). Embedding joint capability of the planning tool through linkages to other automation systems such as Global Transportation Network (GTN) would ensure interoperability (Institute for Defense Analyses 1996, 25).

The legacy army's motto of "Fight as you train," uses the model of "Train, Alert, Deploy, and Fight." In this model, Army units are acquainted with their wartime scenarios and conduct training on them prior to alert and deployment. The transformational imperatives do not allow for this deliberate sequence. Instead, a "train as you fight" mentality is needed due to the impossibility of training for the diverse arenas in which future forces may be called to operate**.** FM 3.0 *Operations* states that units should train with the "train, alert, deploy and employ" philosophy (FM 3.0 2001, 3-11). Units must train for a variety of missions so that once alerted they are ready to deploy to the fight with sufficient understanding of the mission and with the proper situational awareness (CALL 01-5 2001, I-1). Also, units that are well trained on deployment tasks are less likely to require support upon arrival. By training on deployment tasks, including entry operations, units can validate the exact amount of in-theater support to transition upon arrival. The certainty yielded from this familiarity will reduce reception, staging and onward movement requirements that might otherwise be emplaced to hedge against an intheater shortfall. It will also ease integration, as units improve upon their ability to use en route planning tools.

Increasing deployment training as a method to reduce RSOI is feasible because it can be conducted in conjunction with other training, such as the emergency deployment readiness exercises currently used to test the readiness level of rapid deployment units. The IBCT, without doubt, will also conduct such exercises. Applying the RSOI training model currently in place at Combat Training Centers would result in virtually no increase in training cost, so this emphasis on end-to end deployment training is acceptable. Increased deployment training as a measure to reduce RSOI is suitable in that it would discipline units to take the necessary measures needed to deploy with the minimum amount of in theater support necessary. As noted above, it will also validate the exact amount of support required for each unit. An increase in end-to-end deployment training would raise the level of combat and supporting units' familiarity with their joint tasks and thus enhance interoperability.

Joint logistics over the shore (JLOTS) exercises, where two or more services conduct LOTS by transferring cargo from ship to inland staging and marshalling areas can be used to train on the movement of both combat units and prepositioned equipment.

The use of JLOTS, though limited in the scope of material it can bring ashore, can improve RSOI operations by reducing the amount of units being brought in through improved SPODs, thus reducing the reception and staging workload. Also, by directing certain units to arrive via JLOTS to unimproved ports or bare beaches, a commander gains flexibility and the element of surprise. Budget constraints currently restrict JLOTS training to one exercise each year, rotating to different geographic responsibilities (Randall, 2001, 5). More JLOTS training would enhance the feasibility of accomplishing wartime LOTS operations under the less than ideal conditions of most training exercises. It would also improve interoperability of the Army and Navy forces conducting and supported by LOTS.

Tailoring RSOI for interim force opposed and unopposed entry operations

How can RSOI requirements be tailored for both opposed and unopposed entry operations for the interim force? IBCT employment requirements dictate that the unit must deploy in a combat configuration. It admits that it is not optimally designed for forced entry operations. In fact the IBCT's reliance on a robust, world-class APOD, severely limits its ability to conduct forced entry operations, especially into an austere theater where the few APODs that might accommodate the IBCT will likely be well defended. Nevertheless, the question arises as to how RSOI procedures can be conducted in support of forced entry operations. Forced entry operations are tactical operations where the force commander monitors the progress of the flow of forces into the theater during the entry phase. For this reason, it generally considered that RSOI doctrine does not apply to forced entry operations. However, the principles of RSOI as a process to track the build-up of combat power may be applied to an opposed entry scenario. For example, the use of ITV information to capture the arrival and movement of opposed entry forces can assist with the integration of follow-on forces.

Applying the principles of RSOI can assist in the reception and staging of opposed entry forces as the airflow of additional forces and sustainment supplies come into a POD or TAA. Tracking the buildup of combat power on the tactical level is a task that airborne and air assault units typically have difficulty with in training scenarios such the Joint Readiness Training Center. Successful combat power tracking can ease the planning for onward movement for missions staged out of the POD. It can also help units to rapidly integrate additional combat power as it arrives.

Applying the RSOI principles for combat power tracking is feasible, especially with the information system enablers planned for the IBCT. It is acceptable because it capitalizes on pre-existing enablers used for situational awareness. The increased situational awareness gained by the commander by through incorporating RSOI concepts of the combat power tracking enhances its suitability. The ability of units to apply the RSOI model of force tracking comes at no additional expense because with automated sensors and assured communications it can be conducted with organic assets. Interoperability is increased by improved combat power tracking, because it can result in the more efficient use of lift assets.

Reducing RSOI functions for interim force initial entry and follow-on units

How can the Army optimize RSOI functions for both initial entry and follow-on forces of the interim force? The distinction between initial entry and follow-on forces is important with regard to RSOI because the former is designed specifically with immediate action as an imperative, while the latter may not be fully capable of it. For unopposed entry operations, equipment and units do not normally move together. During movement, unit commanders do not have command and control of different parts of units moving by different modes.

The IBCT is only self-sustaining without augmentation from divisional or corps units for no more than seventy-two hours. After seventy-two hours, the base support battalion of the IBCT requires additional support in the form of "scaling" or augmentation from the combat service support company. Also, because the IBCT has no organic aviation or air defense assets and limited field artillery, these division and corps units must be integrated into the flow of initial entry or follow-on forces as required by the commander. This reliance on other units suggests that follow-on forces such as those described above will have to be received, staged, moved onward, and integrated.

The planning and management of the initial entry phase is problematic because of the multi-service competition for limited lift assets. Recent history has demonstrated that the Army can only expect about forty percent of available airlift in the initial stages of a deployment (Davis, C. 2000, 7). Because the IBCT is dependent on APODs for entry into a theater by virtue of its deployment timeline, clearance of those APODs using RSOI concepts such as combat power tracking is critical. The benefits of this approach are similar to those to be gained by opposed entry interim forces.

As discussed above, the IBCT can only operate as a stand-alone unit for a limited time before other units augment its capability and sustainment support is required. Many of these units will be built with the similar capabilities to off-load and sustain themselves. Other equipment such as aircraft require a substantial amount of off-load and reassembly assistance beyond the capability of IBCT units. So for the follow-on units to support and sustain IBCT operations it is not a question whether RSOI is required, but rather how much will be required. Some enablers that may help to reduce this RSOI requirement are ITV systems, and the use of configured loads.

Use of a single system to provide accurate ITV and force tracking capability for deploying units could significantly enhance the efficiency of RSOI operations. A system soon to be fielded, the Transportation Coordinators Automated Information System II (TC-AIMS II) is designed to produce data collection, reporting and processing capabilities which will allow for command and control of RSOI operations. It can also report movement and status of units and forces at all RSOI nodes, including the air and sea PODs, staging areas, TAAs, and along routes (IDA 97, 16). This initiative along with its linkage to other information systems such as the Global Command and Control System--Army and the Combat Service Support Control System (CSSCS), will allow unprecedented strategic and in-theater transportation and distribution command and control.

ITV traces the identity, status, and location of cargo during deployment, including unit cargo and personnel. ITV systems report the information through GTN, which assimilates and disseminates the data to all DOD customers. A key component of ITV is Automated Identification Technology (AIT), an enabler that employs a variety of tools to facilitate the capture, aggregation, transfer, and transmission of data concerning movements. Radio frequency (RF) technology, using interrogators at key transportation nodes, can provide immediate, real-time in-transit visibility by passing data to regional servers in GTN. RF technology has already been installed in more than 150 sites in Europe, sixty in the continental United States and thirty in Korea. It has also been successfully used to support Operation JOINT ENDEAVOR and Operation JOINT GUARD, as well as other deployment exercises (Deployment Process Modernization Office 2000, 5-35).

The use of ITV systems would enhance the ability of support and supported units to command and control the reception and staging process by providing visibility of assets on the ground and inbound. It can also contribute to onward movement planning with its movement control features. ITV assists integration by providing visibility of units to a gaining commander as they move throughout the deployment process. One technique using AIT to reduce reception and staging time while providing visibility of system location would be to place RF tags on deployment platforms to automatically capture data as personnel and cargo are on and off loaded. The same benefits could be derived while unloading prepositioned equipment. This practice, rather than the current practice of manually scanning an item would also reduce in theater personnel requirements (Deployment Process Modernization Office. 2000, 5-62).

Systems to provide ITV are already in development and have been tested extensively in the field, so the application of these systems is feasible. The costs of these systems would be relatively small in comparison with the benefits accrued by a theater commander. By providing near real-time information on the identity, location, and quantity of assets, ITV systems will help commanders rapidly allocate, anticipate and redirect support, thus reducing the logistics footprint and cutting the demand on lift. ITV systems are also suitable to the goal of reducing RSOI because by providing timely and accurate information, they also reduce demand for personnel to track loading and unloading. Another benefit of ITV is the capability to redirect movements. By providing real-time or near-real-time positional data of units, equipment, and passengers, commanders can redirect movements, thus improving the efficiency of onward movement operations (Deployment Process Modernization Office 2000, 3-17). Interoperability is improved because these information systems are designed to integrate joint and service-fed data.

SCLs are built at strategic level to anticipated demands for single or multiple commodities. Typically thought of as ammunition or barrier material, SCLs could also include all sustainment requirements for a unit. Supplies are placed in twenty-foot containers for inter-modal shipment to and within the theater. Palletized Loading System (PLS) trucks "unstuff" containers at the theater staging area within minutes, and move supplies on PLS flat racks. Mission configured loads are built in theater to satisfy a specific unit's known requirements or requisitions. MCLs are designed to fit on a PLS flat rack One technique that may contribute to the ITV of these loads is having SCLs or MCLs marked in a manner that allows easy identification if standard markers (i.e. RF tags) are absent. Each pallet should be marked with the following information and documents to ensure ITV: transportation control number for tracking by ITV systems, military shipping label, and pallet identification sheet.

One challenge to the feasibility of the use of configured loads is the compatibility of the cargo, especially with ammunition, which typically requires segregation of fuses and rounds. Having SCLs configured in depot may also reduce battlefield flexibility and result in certain rounds being delivered in excess. On the other hand, the use of configured loads can significantly reduce handling requirements, thereby speeding movement forward through POD. The movement of configured loads would require less materiel handling equipment, thus reducing the size of the supporting units at the POD, and enhancing the acceptability of the concept.

The concept of configured loads is suitable to the reduction of RSOI by providing speed and operational momentum during multi and intermodal operations, and improving theater movement and distribution C2. The use of SCLs and CCLs potentially eliminates need for handling of cargo between origin and unit. One challenge to the viability of configured loads is ensuring that the pallets designed to carry them are designed for inter-modal lift. If this challenge and the issue of ammunition compatibility can become overcome, it will improve interoperability of deployment with strategic and theater airlift and sea lift. Also, configured loads can enhance operability if they can be designed to support multi-service users, particularly marine ground forces.

Reducing RSOI functions for the objective force in a theater of operations

How can the RSOI functions for the objective force in a theater of operations be reduced? As with the interim force, a variety of enablers may be used to significantly reduce objective force RSOI operations. These enablers can be applied in varying degrees to units conducting opposed and unopposed entry operations, and to initial entry and follow-on units.

Performing objective force RSOI processes prior to arrival in a theater of operations

What measures can be taken to perform or replicate the RSOI processes for the objective force prior to arrival in a theater of operations? The techniques of combat loading, training and strategic and theater configured loads (SCLs and CCLs), as well as enablers such as EMPPS, JFAST, and ITV, discussed in the context of assisting the interim force, can also be used to reduce RSOI for the objective force. The efficiencies of these enablers are likely to be greater with the objective force, however, with the opportunity to include them in the force and equipment design process.

Tailoring RSOI for objective force opposed and unopposed entry operations

How can RSOI requirements be tailored for both opposed and unopposed entry operations for the objective force? When conducting a forced entry, objective forces will be tactically configured and will not initiate RSOI operations, as they are currently defined, until the threat environment allows. Units of Action will likely not require external RSOI support, but as with the interim force, they will benefit by the combat power tracking techniques used within the RSOI construct. Units of Employment are more likely to perform RSOI operations for initial entry and follow-on operations.

Optimizing RSOI for initial entry and follow-on objective forces

How can RSOI functions for both initial entry and follow-on forces of the objective force be optimized? In addition to applying the innovations and enablers that can reduce RSOI requirements of the interim force, the use of split-based operations and ISBs can also further that goal.

The employment of split-based operations is another method of speeding the flow through a POD. Split-based operations take advantage of improved automated control systems allowing management and control functions to be performed at a location physically separate from the site of execution, thus requiring only forces in theater needed to perform the tasks. This can drastically reduce the logistics footprint in theater, thus reducing the strain on reception and staging operations. Given the development of information systems and the TSC structure, the enhancements of split-based operations to RSOI are very feasible. This practice would be acceptable because it fits the distribution-based logistics model currently under development. Split basing also enhances interoperability if information systems between services, such as the global transportation network, are compatible.

The use of ISBs to bridge the gap between strategic and operational movement may allow for a reduction or elimination of RSOI processes in an area of operations. In theaters where the air and sea POD infrastructure is inadequate, ISBs may represent the only feasible manner of continuing the flow of strategic lift without a loss of momentum (Davis, C. 2000, 12). ISBs can provide a "safe haven for reception of cargo into a theater and serve as a transloading point" between strategic and intra-theater level transportation, (Davis, C. 2000, 17). Use of ISBs could eliminate RSOI in an area of operations by placing the reception, staging and integration functions offshore. Onward movement then would become intra-theater lift. Delivering a division in the required five days by air would require such a high volume of aircraft (approximately forty-four C-17 missions in a twenty-four hour period) that few airports could to accommodate it. This suggests that more that one ISB may be required (Davis, C. 2000, 15).

The feasibility of relying on ISBs is limited by the likelihood that adversaries will increasingly take advantage of their own technological advances to target ISBs with ballistic or cruise missiles. In other words, under certain threat conditions, the ISB can become its own vulnerable choke point, once removed from area of operations. Depending upon the threat, the price tag of protecting forward bases with air and missile defenses could be prohibitive. Also, the cost of establishing and maintaining ISBs is also problematic. Political arrangements for the forward basing of troops and equipment can be sensitive and expensive affairs. They can also be time consuming if not agreed to in advance of an operation. For this reason, it would be beneficial to identify and prepare ISBs by developing an ISB candidate list in each regional commander in chief's area of responsibility.

In certain circumstances, the costs and risks of establishing and defending ISBs may be outweighed by their benefit to the theater commander. In general the use of ISBs is suitable to the goal of reducing RSOI because the use of intratheater lift would increase the access to robust PODs, and enhance the commander's maneuverability and ability to direct decisive combat power when and where it is needed. The high incidence of deep, nonlinear operations anticipated by the objective force's employment concepts indicate that intratheater lift often will be required. Intra-theater lift could be the best answer to achieving a high level of throughput into austere PODs (Owen and Fogle 2001, 3). To achieve interoperability, intratheater air and sea lift must be able to interface with strategic mobility forces to move combat ready units from ISBs, once again creating a reliance on connectivity of information systems.

Interim force design considerations

What force and equipment design considerations can be implemented to reduce the requirement for RSOI for the interim force? The Army must design weapons and vehicles to optimize planned lift assets. Many of the enablers envisioned for the sustainment of the interim force also serve as enablers for RSOI. Force and equipment design enablers will reduce the RSOI requirement and their sustainment requirement. One result will be fewer supporting units required to perform RSOI operations. The effect of these innovations is limited by the fact that the IBCT is designed with currently available equipment, so that its equipment design is dependent upon commercial off-the shelf technology and near-term developments in military technology. Nevertheless, it is critical that the deployment imperatives of the IBCT remain in the forefront as equipment is designed and selected.

Force design considerations for reducing interim force RSOI requirements

What force design considerations can be implemented to reduce the RSOI requirement for the interim force? The interim force is organized so that it can be deployed easily while maintaining unit integrity and lethality. Because the force design of the interim force is already determined, the unit design of an enabling organization, the TSC, will be considered here.

The TSC is an echelon above corps organization that can be task organized to support interim force RSOI. The TSC is the emerging Army method of providing the right mix of CSS and other logistic support to conduct initial reception, staging, and onward movement tasks. The TSC, a multi-functional CSS organization, is a modular organization designed for early deployability and for split-based operations. The TSC can deploy CSS and CS units (military police, engineers, and chemical units) as a theater force-opening package (TFOP), while the TSC headquarters deploys an early entry module to provide command and control of TFOP units (FM 63-4, 4-22).

The TFOP is the TSC element responsible for establishing the in-theater infrastructure and conducting RSOI operations. In effect, the TFOP serves as a functional RSOI task force. The TFOP is a modularly configured, theater-level, early-entry, multifunctional support task force comprised of functional combat service support (CSS) and selected combat support (CS) modules called theater force opening modules (TFOMs). The purpose of the TFOP is to deploy early to a force projection theater and establish the physical, resource, communications, and automation networks necessary for an effective and efficient Army theater distribution system. It also conducts the initial reception, staging, and onward movement of Army resources and other resources as designated.

To be effective, the TFOP must deploy as early as possible, in order to manage the flow of assets into theater from the outset. Such early entry of CSS organizations will actually minimize the CSS footprint by avoiding the calling forward of entire EAC CSS units when only the functionality of the unit might be needed. It will also ensure that supplies flowing into theater do not stack up into “iron mountains.” The theater commander determines the specific mission, organization, and command and support relationships of early entry support forces in a particular operation. Preparation for theater opening begins before the actual deployment of TFOP elements into an area of operations. The TFOP has the capability to conduct home station (power projection platform) contingency planning and interface with appropriate commands preparing for TFOP employment. The TFOP transportation, supply, ordnance and other required TFOMs establish initial theater APOD, SPOD, and theater staging base reception nodes within the theater. The TFOP transportation, supply, force provider, engineer (if directed), maintenance, personnel, and medical modules establish and conduct initial theater staging operations.

A typical TFOP early entry module needed during the initial buildup phase includes transportation, medical, engineer, supply, contracting, and medical modules, as well as strategic logistics cells from the Defense Logistics Agency's Defense Energy Support Center, the Military Traffic Management Command, the Army Materiel

Command, and many other functional command organizations. As the theater matures, the EEM receives additional TSC elements and transitions to a full-up TSC. The EEM is designed to provide command and control, reception, staging and onward movement management, distribution management, contracting, host nation support, and terminal operations oversight, as well as personnel, finance, medical service, and engineer management. Figure 7 shows the potential organization of the TFOP and its relationship to the services in a theater.

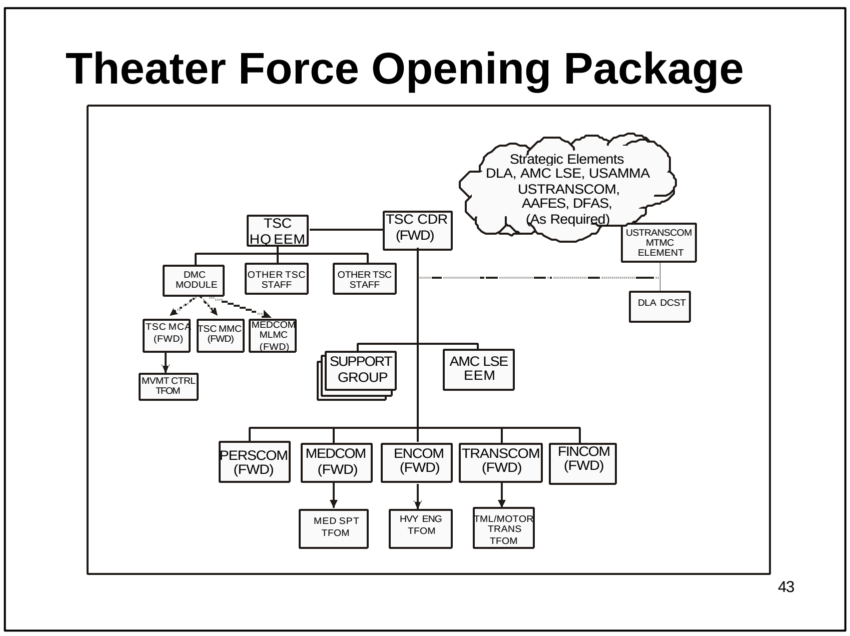


Figure 7. Theater Force Opening Package

<u>TFOP RSOI Functions</u>

During reception, the TFOP establishes GTN and ITV connectivity. It also establishes operations at SPODs and APODs, and transitions port operations to contract or foreign nation support sources. The TFOP supports staging by operating the initial theater support base facilities, with the ability to transition them to contract or foreign nation support sources. It prepares Army Prepositioned Stock (APS) equipment and transfers it to using personnel, and establishes staging areas for transitioning personnel, equipment, and supplies. During onward movement, the TFOP establishes movement management activities, identifies main supplies routes and establishes a distribution structure consistent with the theater commander's priorities.

The TFOP's modular design minimizes strategic lift requirements by deploying the minimum structure needed to accomplish the reception, staging, and onward movement tasks successfully. Lessons learned from the Gulf War taught the importance of establishing a theater-level logistics plan early in the deployment and keeping ports open to receive materiel from the strategic-level sustainment base.

Once in place, the TSC allows the commander to command and control all resource reception, staging, and onward movement while maintaining total asset visibility through communications and information systems. The TSC and the TFOP are the critical links among strategic agencies and commands and units performing Army distribution in theater. Also, the TFOP can play an important role in the process of relocating deployed forces within theater, such as between an ISB and an area of operations.

The feasibility of the use of the TSC is directly related to how the TSC units enter a theater of operations. The same early entry imperatives of the objective force must be applied to the TSC elements expected to rapidly deploy. Using combat loading, improving TSC deployment training and the placing TSC equipment on prepositioned sets would reduce RSOI by ensuring that the needed materiel handling equipment, vehicles, life support equipment, AIT devices and sustainment stocks are readily available to first deployers. The cost savings brought through unity of effort by consolidating communications, material and infrastructure under a single functional command are significant, and increases acceptability of the TSC.

The TSC is suitable to the task of reducing RSOI for the interim force. Because RSOI operations must absorb a huge workload on a surge basis, especially for deployment by sea and air, either at a POD or an ISB, the TSC's modular capability can meet those surge requirements by task organizing by function, as necessary. By improving the efficiency of resources at the POD through unity of command and unity of effort, the TSC can indirectly increase the flow of units and supplies through a POD while maintaining a smaller footprint. Of course, these benefits can only be realized for unopposed entry or follow-on operations.

The current TSC structure has the capability to grow to the task, but it must be disciplined so that it can ensure that it also remains responsive to smaller-level operations and does not impose a large footprint on the theater commander. This is consistent with the RSOI principle of Optimize Logistical Footprint, which emphasizes the need to match the requirement with the proper forces to provide support (FM 100-17-3, 2-5). By first identifying tasks or functions that must be performed to support the interim or objective force in order to begin designing specific organizations, the TSC can ensure that it remains suitable and relevant. The TSC is designed to interface with multi-service customers by integrating cross-service representation, and it allows for augmentation from other service liaison sections, so it has built-in interoperability.

Interim force equipment design

What equipment design considerations can be implemented to reduce and/or eliminate the requirement for RSOI for the interim force? The opportunity to influence the design of the interim force equipment is limited due to the accelerated fielding timeline of the IBCT, which is based upon currently available equipment. Once again, it is critical that the deployment imperatives of the IBCT, such as the stipulation that all items fit in a C-130 equivalent airframe, remain in the forefront as equipment is designed and selected so that it remains as deployable as possible.

One consideration for equipment design is whether the objective force should be composed of wheeled or tracked vehicles. An all wheeled force would greatly reduce the burden of staging and moving equipment in theater by greatly reducing or eliminating the need for movement by heavy equipment transport trucks or rail (Davis, C. 2000, 24).

The light armored vehicle has already been designated as a prototype wheeled vehicle for the interim force. There is also a large amount of technology previously developed by other nations that can enhance the feasibility of rapidly fielding wheeled vehicles. Capitalizing on the use of previously developed technology would enhance the acceptability of the cost of wheeled systems. The use of wheeled vehicles would speed transitions at PODs or ISBs due to their ability to self off- load and move without truck or rail support. Wheeled vehicles would also reduce in-theater support needs (of fuel, repair parts, and material handling equipment) and reduce consumption of sustainment supplies (Davis, C. 2000 26). Reducing the airlift requirement to move interim force units would enhance interoperability by improving the use of available lift assets.

Objective force and equipment design considerations

What force and equipment design considerations can be implemented to reduce RSOI requirements for the objective force? The Army cannot rely solely on improvement of transportation capabilities to achieve the objective force deployment goals, for a variety of reasons. It must therefore gain efficiencies in force projection through the design of units and their equipment, which will improve transportation capability.

Force design considerations for the objective force

What force design considerations can be implemented to reduce RSOI requirements for the objective force? The objective force needs to be designed so that it can be deployed easily while maintaining unit integrity and lethality. It should also be designed in modular units capable of split-based operations. All of these considerations, for reasons already discussed with regard to reducing the RSOI requirements of the objective force, also apply to its force design. Forces that are designed to be integral, modular and deployable directly into operations will require little or no reception, staging, onward movement or integration.

The distinction between units of action and units of employment is helpful in this regard because it allows for units that are more rapidly task organized and more readily integrated into a gaining unit. Such mission tailoring of forces, along with headquarters designed to easily accommodate augmentation from a variety of modular units, would give commanders the ability to select the right size force for each mission. This would reduce demands on lift as well as in-theater support.

Equipment design considerations for the objective force

What equipment design considerations can be implemented to reduce and/or eliminate the requirement for RSOI for the objective force? Key to accomplishing the employment imperatives of the objective force is the development and acquisition of systems with characteristics consistent with those goals. Key enabling technology must be identified and developed in order to design these systems. A variety of methods to lighten the objective force while retaining lethality are under consideration. These methods will also reduce RSOI requirements for rapid force closure by allowing for ease of off-load, combat configuration, and requiring less sustainment.

Objective force systems must be lighter, smaller, more capable and sustainable.

Reducing the size and weight of objective force units will allow more efficient transportability. Objective force combat units must have lighter and fewer deployable systems. A common set of vehicles that are 50 to 70 percent lighter but just as mobile, survivable, and more reliable (Association of the United States Army 2000, 2). Also, future delivery platforms must be more maneuverable, embedded with movement tracking and prognostics systems, and equipped with load handling systems which integrate with into future combat systems vehicles. Integrated, common formed packaging, which is interchangeable on any theater platform, is critical to achieving the speed and momentum needed for objective force deployment. A common chassis with modular features that can be added as the mission requires would allow the lift burden to be divided among multiple airframes. This would also "allow the force to be configured for the type of mission to be conducted, for example "more protection for urban operations, more sensing capability for recon operations, and less payload for maneuver operations (Gritton et al. 2000, 52).

As with the interim force, an important consideration for equipment design is whether the objective force should be composed of wheeled or tracked vehicles. The same benefits of a greatly reduced staging and onward movement requirement and support requirements also apply to the objective force (Davis, C. 2000 26).

Narrowing the "tooth to tail" ratio in a theater of operations can also reduce RSOI. A more favorable ratio of combat troops to support troops can be achieved through a variety of measures. Among those measures being considered are technological innovations such as precision munitions, fuel-efficient vehicles that have propulsion systems independent of fossil fuels, and "ultra-reliable" systems. The effect of these developments is not only a smaller, lighter force to deploy, but also reduced weight of basic loads of ammunition, fuel, repair parts, rations, and water. Improved energy efficiency and enhanced reliability means that a combat force can operate for longer periods without replenishment, thereby reducing the airlift dedicated to support equipment (Gritton et al. 2000, 52). Some of the improved munitions include more precise targeting capability, smaller-projectile hyper velocity rounds with the same penetration and killing power currently derived from kinetic energy, as well as electro-thermo, chemical, or electro-magnetic gun technology (Kern 2002, 3).

Vehicles must also be able to use space more efficiently. Some equipment should "be stackable and configured to fit the size and dimensions of standard load pallets and containers" (Gritton et al. 2000, 52). Examples of the types of containers that could be used to move such equipment are the container roll-on/off platform and its aircraft interface kit, which are designed to support all classes of supply. By maximizing lift capability and minimizing the material handling equipment requirement, these containers expedite handling at a POD or an ISB. Another consideration is designing objective force equipment so that it is more compatible with commercial lift, thereby capitalizing on existing and emerging commercial capability (Association of the United States Army 2000, 5). Using commercial aircraft to move forces into an ISB would free up military aircraft for theater lift purposes. The use of commercial aircraft has its own set of limitations, however, as discussed below.

The feasibility of these technologies is linked to how rapidly they are developed and integrated with other objective force equipment within its fielding timeline. The acceptability of these systems is difficult to judge due to the "high risk" and high cost of the technology required, but the payoff of successful implementation of any of these technologies will yield great savings in lift and provide invaluable flexibility for commanders (Davis, C. 2000, 22). On the other hand, it is certain that once developed these technological innovations will vastly reduce deployment and RSOI demands. Also, reducing dependence on sealift and airlift with a platform that is more easily transported and transitioned will improve interoperability.

Reducing RSOI requirements for the interim force through improvements in airlift and sealift

How can the use of air and sealift assets be improved reduce RSOI requirements for the Interim Force? The employment considerations of the interim force require the use of lift platforms that can bypass major airbases or ports or overcome the threats posed by opponents attempt to deny access to airports and seaports. This will require not only different kinds of lift platforms, but also new concepts for their use. There is a strong tendency here to address the wider aspects of the adequacy of airlift and sealift, as discussed in the delimitations section of chapter 1. However, the challenges of moving the interim and objective force merits broader consideration than suitable in this thesis and has been discussed in detail in other forums. Analysis in this thesis will address the manner in which improvements in air and sealift can reduce RSOI requirements. The nature of the topic must, however, include initiatives in the acquisition of lift assets and their use. Analysis of the interim force is limited to current lift designs.

Improving the use of airlift to reduce RSOI for the Interim Force

How can the use of airlift be improved to reduce RSOI requirements for the interim force? Recent studies have determined that current DOD airlift assets cannot support the IBCT deployment timeline (Smith 2000, 69). Because operations since Operation DESERT STORM have been relatively small in scale, availability of airlift has not been a limitation. The challenge of moving the IBCT by air in ninety six-hours will call for more airlift and better use of the airframes available. Limitations on aircraft will also affect the ability to move support assets into theater. Improved reception and staging capability can increase the efficiency of available aircraft by improving aircraft turnaround times and increasing the working MOG level at APODs. Options to improve airlift and RSOI operations include acquiring more C-17 transport aircraft, and improving use of commercial aircraft through the Civil Reserve Air Fleet (CRAF).

By one estimate, the IBCT would require up to thirty-two C-17s and thirty-five C-5s to move the entire brigade with the ninety six-hour deployment timeline under optimal conditions (Smith 2000, 91). This requirement may be impossible to meet with the current fleet.  Based upon historical precedent, the Army is allocated less than forty percent of available aircraft during contingencies.  Also, available aircraft are limited by readiness rates and training allocations (Davis, C. 2000, 7).  The C-5 fleet is aging and not designated for major reinvestment, so the IBCT will rely primarily upon the C-17. The C-17 is uniquely designed to provide the right kind of lift for the IBCT.  It can move the full range of Army equipment, and is capable of "carrying outsized cargo to, from, and within a theater directly to small, austere forward airfields" (Association of the United States Army 1999, 10).  Although most discussion of the IBCT centers on the requirement that all of its equipment be able to fly in C-130 equivalent aircraft, the C-17 can provide the IBCT with both strategic and theater air lift, thus providing the ability to bypass ISBs and fly directly into a theater of operations.  The capability to bypass ISBs would potentially reduce RSOI requirement with the benefit of enablers such as ITV, SCLs and CCLs, and combat configuring available to the IBCT.

The C-17 fleet currently has a procurement ceiling of 135 aircraft.  Increasing the fleet target to 180, as currently being considered, would approach the capability needed to move the IBCT within its timeline and would improve theater airlift capabilities.  The expense of acquiring more airlift must of course be justified.

Increasing the C-17 fleet is a feasible solution from the standpoint of proven technology and a developed industrial base.  Also, lift and combat units are already trained on the C-17.  However, the commitment of funding for the C-17 for strategic and theater lift would take away funds for Army transformation, and intra-theater lift assets. Also, the C-17 is not the optimal aircraft for IBCT forced entry operations, which require air-land capability, so the use of the C-17 would be confined to unopposed operations or to follow-on forces.

The suitability of increasing the C-17 fleet is based on the IBCT's reliance on airlift to move within the deployment timeline. The C-17's range, versatility and capacity could represent the best method to get the IBCT to theater and strategic destinations in a rapid manner. Also, the capabilities of an expanded C-17 fleet could reduce reception and staging requirements by putting forces directly into an area of operations, given proper airfields and organic off-load capability. From an interoperability stand point, an increased fleet of C-17s would help all services to get their required share of equipment into the fight.

The Civil Reserve Air Fleet (CRAF) comprises a significant part of the DOD's mobility resources. Composed of selected aircraft from U.S. airlines, which are contractually committed to DOD, CRAF provides airlift requirements when airlift exceeds the capability of military aircraft. CRAF can provide passenger and cargo aircraft capable of transoceanic operations. The role of these aircraft is to augment the Air Mobility Command's (AMC) long-range intertheater C-141s, C-5s and C-17s during periods of increased airlift needs. Participating airlines contractually pledge aircraft to be ready for activation when needed. All aircraft must be U.S.-registered aircraft capable of overwater operations, at least 3,500 nautical mile range and 10 hours per day utilization rate. Airlines must commit and maintain at least four complete crews for each aircraft. The commander in chief, USTRANSCOM, with ultimate approval of the Secretary of Defense, is the activation authority for all stages of CRAF. When notified of call-up, the carrier is required to have its aircraft ready for a CRAF mission within 24 to 48 hours after mission assignment (Smith 2000, 76).

The use of CRAF into ISBs could reduce RSOI requirements by freeing up military aircraft for theater airlift. On the other hand, it could increase reception requirements because it is less likely to accommodate combat configured and self-unloading equipment. The use of CRAF is politically and economically costly. Furthermore, the caution required in the use of civilian crews and assets limits the scope of its use (Smith 2000, 76).

One problem with the suitability of CRAF is that it is not available for deployment timelines within less than a week, such as the ninety six-hour deployment objective of the IBCT. The approval process currently takes approximately twenty-four hours and the initiation process typically takes twenty-four to forty-eight hours (Smith 2000, 77). The IBCT's timeline is not supportable if CRAF requires forty-eight to seventy two hours at best to activate. Most CRAF aircraft need at least 10,000 feet runways with large parking ramps and a low threat level severely restricting the number of APODs in austere theaters where CRAF could be used (Owen and Fogle 2001, 7). Another potential problem with the use of CRAF to move interim force cargo is that the dimensions and design of CRAF cargo aircraft are not usually arranged to move combat configured equipment or specialized military containers, once again limiting their utility. For these reasons, the use of CRAF for the interim force would only be limited to strategic deployments to robust, secure APODs, or for follow-on units to deploying to unopposed locations.

Improving the use of sealift to reduce RSOI for the interim force

How can the use of sealift be improved to speed the deployment process and reduce RSOI requirements for the interim force? The use of sealift has certain advantages over the use of airlift. The most obvious advantage is volume. Currently, approximately ninety percent of military equipment is transported to contingency areas by sea. Sealift is also more easily configured to capitalize on the speed and momentum of containers by using standard containers with inter-modal capabilities, ensuring the ease and speed of moving vehicles from one mode of transport to another. Large vessels such as the LMSR, roughly equivalent to an aircraft carrier in length, can be used en route to configure equipment for specific theater requirements. Also, because sealift platforms are better suited than airlift assets for moving combat configured units, they can reduce RSOI requirements by allowing for immediate employment upon debarkation.

The major drawback to sealift has always been its lack of speed. Upload, transit, and download times can be prohibitive. The requirement for material handling equipment and developed deep-water ports is also a constraint. One solution to the time-distance problem for the interim force would be to place some of it on prepositioned vessels.

As discussed above, the expansion of prepositioned equipment, both afloat and land-based, significantly enhances strategic responsiveness and reduced elements of the RSOI process. Currently, Military Sealift Command maintains thirty-seven ships with supplies and unit equipment. These ships are located in the Mediterranean Sea, the Indian Ocean, and the Pacific Ocean near Guam and Saipan (REV in Power Projection, 1).  Appendix 2 shows the current army prepositioned stocks locations and the types of vessels on which prepositioned afloat stocks are uploaded.

The current composition of prepositioned units, however, is designed to support legacy force operations with large concentrations of forces, built-up PODs, and deliberate RSOI (Gritton et al. 2000, 12).  As the interim force is fielded and the objective force is developed, prepositioned equipment must also adjust to new mission requirements. Some potential methods of improving prepositioned equipment so that it can reduce RSOI requirements include loading it in combat configured sets, moving prepositioned materiel towards the theater upon initial threat increase, including port-opening packages with prepositioned equipment (Association of the United States Army. 2000, 1) ensuring prepositioned equipment includes updated capability for communications and ITV, forward basing prepositioned equipment on theater sea lift platforms such as the HSS, and placing prepositioned equipment on multi-modal containers or racks systems to maximize transition and throughput capability.

Such improvements in prepositioned equipment can reduce the reception and staging effort by ensuring that port-opening equipment arrives early.  By moving combat configured units and in some cases, providing the space to allow forces to be configured for missions en route, the reception and staging requirements can also be reduced. Another advantage of prepositioning equipment afloat is the opportunity to conduct en route mission planning and rehearsal on board, allowing units to arrive in theater fully integrated.

One disadvantage in the use of prepositioned ships versus airlift is that airfields tend to be less vulnerable than seaports because most regions have more airfields than ports, making it more difficult for an opponent to predict the place of arrival. Also, one ship with prepositioned equipment is easier for opponents to target than several aircraft. The costs of modifying the composition and use of prepositioned equipment, maintaining it at a high level of readiness and routinely sailing it to crisis regions is likely to be high, but compared to the costs of developing high speed ship (HSS) technology or doubling airlift assets, it may prove to be a bargain (Gritton et al. 2000, 19).

Current vessels with prepositioned equipment are not suitable for the ninety-six hour timeline for initial combat elements, but they could support timelines of ten to twenty days (Lamp 2000, 21). Because of the sheer volume capacity, even one or two ships can carry units required for a certain mission. By prepositioning ships in areas of concern or deploying them provisionally upon strategic warning, this deployment time can be drastically reduced. Also, Army policy can be changed to forward position them routinely in certain regions according to a routine schedule, much as the Navy moves its carriers to crisis regions. Prepositioned equipment can also improve interoperability of the interim forces, by including multi-service equipment or units and their special sustainment stocks, such as munitions.

How can the use of strategic air and sealift assets be improved to speed the deployment process and reduce RSOI requirements for the objective force? The Army and the DOD are considering are variety of emerging concepts to improve air and sealift for the objective force. The evaluation here will focus on new air and sealift platforms, and how their use could reduce RSOI requirements for the objective force.

Reducing RSOI requirements for the objective force through improvements in airlift

How can the use of airlift assets be improved to reduce RSOI requirements for the objective force? Because the objective force will most likely deploy by air between theaters in C-17s and within theaters by C-130 equivalent aircraft, both strategic and theater air capabilities need to be considered**.** The objective force would certainly benefit from a larger C-17 fleet, but there are some emerging airlift concepts that may better reduce its RSOI requirements.

One strategic lift concept under research is the global aircraft. This platform, referred to as "lighter than air" aircraft (Davis, C. 2000, 22) or ultra-large aircraft" (ULA) (Association of the United States Army 2000, 5) is essentially an enormous blimp capable of moving 500-ton loads at one hundred and twenty knot speeds (Davis, C. 2000, 22). Such aircraft could reduce reception and staging by moving entire combat configured units in a single lift and emplacing them near an area of operations, reducing the need for onward movement. Also, with enablers such as EMPPS, ULAs can bring units can into a theater of operations fully integrated.

The feasibility of developing ULA technology is closely tied to the civilian sector's interest in their use for commercial purposes. The use of the ULA by the civilian sector would also improve the acceptability of the ULA concept's cost. Its cost is unknown, but could certainly be prohibitive, if the commercial sector does not also develop use of ULAs independently. Also, ULAs would most likely limited to secure APODs or ISBs due to its high profile and vulnerability, making their use less acceptable.

A fleet of forty aerocraft could conceivable move a heavy legacy division within thirty days, much less for an objective force unit (Davis, C. 2000, 22). However, deployment times less than a week will be difficult to achieve, limiting its use to follow-on forces. Even if one accepted that airships could deploy units within three to four days, based upon speed, the “real-world deployment times would likely be longer because of loading and unloading, en route fueling . . . assembly time and maneuver from points of debarkation to the combat area” (Gritton et al. 2000, 17). Another problem with the ULA is that it would require special ground support equipment to off-load, adding to RSOI requirements (Davis, C. 2000, 22).

Objective force units are also likely to require a C-130 equivalent payload. In the future either a tilt rotor aircraft or large conventional helicopter could provide this capability. Designs are being evaluated that could bring 30-ton loads onto 500-foot runways (Government Accounting Office 2001, 17). Both the tilt-rotor aircraft and the Future Transport Rotorcraft (FTR) could allow combat loaded units to rapidly transition from strategic platforms, thus reducing reception and staging requirements. They would be able to operate without improved airfield surfaces, thus potentially eliminating the need for a POD support structure in an area of operations.

Correspondingly, a limitation on the feasibility of using intratheater airlift is that they still may require hard-packed runways and parking ramps unless extremely short-landing and low-ground pressure capabilities can be designed (Owen and Fogle 2001, 3). Also, unless in-flight refuel methods for the tilt-rotor aircraft or the FTR are developed, their range might be limited. As with the discussion of the vulnerability of ISBs, intratheater airlift such as the tilt rotor aircraft or the FTR may also be vulnerable at ISBs and to air defenses. Protection of forward bases in theater, potentially within range of opponent’s cruise and ballistic missiles, may become an expensive proposition.

One advantage to the suitability of tilt rotor aircraft or the FTR is their potential to deliver medium weight units such as the interim and objective force to wider range of airports and airfields, thus providing commanders with great flexibility in the manner that the deploy and employ forces (Owen and Fogle 2001, 6). The tilt rotor aircraft or the FTR could improve interoperability by their ability to rapidly transfer interposal loads at ISBs or PODs and in the area of operations.

Reducing RSOI requirements for the objective force through improvements in sealift

How can the use of sealift assets be improved to speed RSOI requirements for the objective force? Currently, surge sealift capability is a major constraint for rapid deployments due to its relatively long upload, travel and download times. Also, sealift operations that bring administratively loaded units into major ports tend to require extensive RSOI support. A potential means to assist in both the deployment and RSOI of the objective force is modifying the prepositioned afloat fleet, as discussed with the interim force. Another method being considered to reduce transit time and RSOI requirements is the high-speed ship (HSS) concept.

An example of the HSS concept being developed for the objective force is the Theater Support Vessel (TSV) concept. This high-speed sealift platform (FF-22) would require little or no reception or staging in theater because it can serve as a delivery platform using shallow, unimproved ports, or bare beaches. Equipped with a ramp, little or no materiel handling equipment would be required. The HSS concept significantly improves RSOI operations by easing reception and staging, as well as integration. The maneuverability of unit s loaded in combat configuration should preclude the need for onward movement, although movement control functions must still be performed for tasks such as route deconfliction (unit level automation, such as TC-AIMS II, and the advantage of split-based operations can enable this.). The capability of en route mission planning and rehearsal, coupled with assured communications upon arrival in the area of operations or in theater, can accomplish integration prior to arrival.

The Joint Venture HSV-X1 is currently undergoing testing by the DOD, is a high-speed, wave-piercing sealift catamaran vessel, built and designed by Australian shipbuilders. Such high-speed vessels may be able to move troops, heavy military vehicles and equipment together. Figure 8 depicts the Joint Venture HSV-1, currently being tested by the DOD.

Figure 8. The Joint Venture HSV-1

Its capabilities would include a helicopter pad suitable for large military helicopters such as the SH-60 Seahawk and the CH-46 Sea Knight, and a two-part, hydraulically operated vehicle ramp that allows rapid loading and discharge of vehicles from the stern or alongside it. The vessel’s speed, high payload, will allow it to operate at long ranges with the ability to tailor the payload for optimum mission success.

The Army's focus for experimentation is to validate and assess the vessel's capability for meeting transformation concepts such as simultaneous deployment and employment of the objective force; fight on arrival; en route mission planning and rehearsal; passengers and equipment moving together; bypassing strategic and operational chokepoints; and entry operations at multiple points. Selection of a vessel will allow the Army to refine its operational requirements and acquisition strategy as it designs the objective force. The vessel can also be modified for theater specific requirements. For example, the Army is currently determining the requirements for such a fast speed intra theater lift asset in Southwest Asia. Very recently, the CENTCOM commander submitted a Request For Forces for a High Speed Shallow Draft vessel capability to provide intra-theater sealift within the AOR (Army Leadership Notes 2002, 2).

An important factor in judging the feasibility of the HSS is that the technology for the TSV and other HSS is already being developed, both in the civilian and military realms. Also, their speed and versatility is an already proven commodity. The acceptability of the HSS concept centers on whether the cost of purchasing enough ships to move a significant sized force into a theater of operations would be affordable.

As with the ULA, the commercial viability of the concept is critical to offset military costs. For low capacity HSS, commercial viability is uncertain because the commercial sector would have less use for them for commercial shipping. For high capacity HSS, “high-risk” technology must be developed at a corresponding high cost (Davis, C. 2000, 22). As for the suitability of the HSS, its ability to move entire combat configured units long distances at relatively high speeds, and to rapidly off-load in shallow ports or in stream represents great advantages to a theater commander. The ability to conduct en route mission planning and rehearsal onboard HSSs adds to their utility. The HSS concept's interoperability is aided by the fact that it is already a joint-service experiment, currently coordinated by the Navy Warfare Development Command in close partnership with elements of the Army, Navy, Marine Corps and Coast Guard, as well as representatives of US Army Europe, US Army Pacific, US Forces Korea, Forces Command, and Southern Command.

## Summary

Previous chapters examined the employment and employment goals of the interim and objective force and discussed RSOI doctrine and practices. This chapter has reviewed the performance of RSOI operations and analyzed potential methods to improve its ability to support interim and objective force employment goals. The final chapter will build upon this analysis to make recommendations on methods to improve RSOI operations and to present conclusions on the future validity of RSOI.

# CHAPTER 5

# CONCLUSIONS AND RECOMMENDATIONS

> He who occupies the field of battle first and awaits his enemy is at ease; he who comes later to the scene and rushes into the fight is weary. (Sawyer, 1994, 191)
>
> Sun Tzu

## Introduction

Achieving the transformation objectives as expressed by the Chief of Staff of the Army's vision poses significant challenges to those responsible for ensuring the Army's strategic responsiveness. Because strategic responsiveness is fundamental to the Army's transformational goals, those challenges are a mandate to improve deployment capability through emerging technologies and processes in order to change the manner in which US forces are deployed and employed. More than simply deploying faster, strategic responsiveness also includes generating, training, swiftly deploying and simultaneously employing the right forces at the time and place required by the commander (FM 3.0, 3-18).

The critical link between strategic responsiveness and tactical maneuver is RSOI. Essential to the speedy assembly of combat power, RSOI technologies and processes must enable the transition of interim and objective forces from strategic mobility to tactical maneuver with no loss of momentum. The analysis conducted in this thesis indicates that there are several viable means to improve RSOI so that it will continue to serve as a relevant and responsive concept for future operations.

## Thesis Question

The thesis primary research question is to determine and evaluate methods to simplify and reduce the RSOI process of force projection in order to enable the deployment and operational goals of the interim and objective forces. The secondary questions that addressed to answer the primary question were how to reduce and simplify RSOI functions for the interim and objective forces in a theater of operations by performing RSOI processes prior to arrival in a theater of operations, tailor them for opposed and unopposed entry units and for initial entry and follow-on forces; what force and equipment design considerations can be implemented to reduce and/or eliminate RSOI requirement of the interim force and objective forces; and how to improve the use of air and sealift assets to reduce RSOI requirements for the interim force and objective force. This set of intentionally broad questions has yielded a wide array of possible solutions, as well as several related topics to recommend for further study.

## Conclusions

Reviewing the performance of RSOI operations and analyzing potential methods to improve its ability to support interim and objective force employment goals leads to several conclusions about the transformation of RSOI. General conclusions regarding future RSOI operations, the interim and objectives forces are offered first, followed by specific conclusion regarding potential methods of improving RSOI.

### The Future of RSOI

First, upon reviewing RSOI, it is evident that RSOI as known and practiced today will not support the intent of future interim and objective force commanders. The transformational imperatives of the interim and objective forces require a more efficient means of establishing combat power in a theater of operations. Although the development of RSOI doctrine and practices has produced significant force projection efficiencies, the logistical footprint required for deliberate RSOI operations is unacceptably large, driven by a complex inventory of equipment and high replenishment demands. RSOI has frequently been the system constraint in the flow of forces into theaters of operations. Time and lift intensive, RSOI require large amounts of personnel and resources. RSOI also places deploying forces at risk, as they transit vulnerable modes, nodes, staging areas and routes that can be high priority targets for US opponents.

Although RSOI can present a system constraint on deployments, suggestions to eliminate it ignore the positive contributions it has made as a construct for transition during entry operations. It is also apparent that the principal cause of RSOI's protracted, vulnerable performance in recent deployments is directly related to the large, unwieldy composition of the legacy forces that it supports. The force and equipment design improvements of the interim and objective forces will go far in reducing the footprint of RSOI. This does not mean however that RSOI is no longer needed, especially for follow-on forces and for sustained operations. Rather than assuming that RSOI requirements will disappear, the Army should continue to improve its ability to transition during entry operations by enhancing the conduct of RSOI. As discussed below, a variety of measures can be taken to improve the efficiency of RSOI operations.

The interim forces require support during reception and staging, especially with sustainment stocks. The IBCT can operate as a stand-alone unit for a very limited time before augmentation and sustainment support is required. Although many of these augmenting units will be designed with similar capabilities to off-load and sustain themselves, other equipment such as aircraft will require assistance with off-loading and reassembly. Therefore, follow-on units to support and sustain IBCT operations will require reception and most likely, staging assistance. The division and corps follow-on units must be integrated into the flow of initial entry or follow-on forces as required by the operation, adding to the burden on lift and POD clearance challenges. The IBCT's reliance on other units suggests that follow-on forces such as those described above will have to be received, staged, moved onward, and integrated.

Similar to the interim force, the objective force's units of employment, especially for sustained operations, will require RSOI either at an ISB or in theater. Although units of action may be able to conduct entry operations without external RSOI support, RSOI doctrine may serve a valuable role in commanding, controlling, and tracking their arrival in theater.

Force Tailoring

Deploying units in combat configuration would reduce the need for reception and staging by eliminating the need to marshal vehicles and personnel separately and to receive, stage, issue or distribute supplies. Materiel handling equipment and in-transit visibility requirements would also be reduced. Combat configured units could more easily perform onward movement with organic assets if they arrive combat loaded. Also, the integration of units is essentially complete once units establish communications with themselves and the theater command with their uploaded communications equipment

Training

Increased deployment training for wartime missions as a measure to reduce RSOI would result in units disciplined in the tasks necessary to deploy with the minimum amount of in theater support. Frequent deployment training would also validate the exact amount of support required for each unit. Additionally, more JLOTS training would enhance the feasibility of accomplishing wartime LOTS operations under more rigorous ideal conditions than found in most training exercises and would improve interoperability of the services conducting and supported by LOTS.

Enablers

Use of a single system to provide accurate ITV and force tracking capability for deploying units could significantly enhance the efficiency of RSOI operations. By providing near real-time information on the identity, location, and quantity of assets, ITV systems would help commanders rapidly allocate, anticipate and redirect support, thus reducing the logistics foot print and cutting the demand on lift. ITV systems could also reduce RSOI by providing timely and accurate information that will in turn reduce demand for personnel to track loading and unloading. ITV could also improve the efficiency of onward movement operations by providing the capability to redirect movements with positional data of units, equipment, and passengers.

With EMPPS or a similar enroute planning tool, integration could be performed prior to arrival in theater. Platforms such as the TSV, designed with built-in communications and information systems, could allow units to conduct en route planning and rehearsals. Also, the capability to conduct end-to-end transportation analysis with an improved version of tools such as JFAST would allow planners to assess the capabilities of a planned LOC for RSOI to a deployment plan being developed. By modeling RSOI operations in the planning stage, an improved version of JFAST would permit effective planning of reception and staging by identifying port capabilities and matching them with the support requirements for each unit arriving at a POD.

Another method of reduce handling requirements would be the use of configured loads for UBLs and for sustainment. The movement of configured loads requires less material handling equipment, thus reducing the supported required in theater and speeding movement forward through the POD.

Using ISBs to bridge the gap between strategic and operational movement can significantly reduce or eliminate RSOI processes in an area of operations. ISBs may be the only feasible manner to continue the flow of strategic lift without a loss of momentum in theaters with inadequate infrastructure. As a safe haven for reception of cargo and a transloading point between strategic and intra-theater level transportation, ISBs can eliminate RSOI in an area of operations by placing the reception, staging and integration functions offshore. Onward movement then would become intra-theater lift; perhaps the best means to achieve a high level of throughput into austere PODs

Force Design

Improved force design of the TSC could improve RSOI operations by identifying supporting tasks and functions for specific operations earlier in order to design tailored support task forces. Through the TFOP and the TFOM designs, the TSC could significantly improve the efficiency of RSOI operations. The TSCs modular capability can meet surge requirements by task organizing by function, as necessary. By improving the efficiency of resources at the POD through unity of command and unity of effort, the TSC can indirectly increase the flow of units and supplies while maintaining a smaller footprint. However, the same early entry imperatives of the objective force must be applied to the force and equipment design of TSC elements expected to rapidly deploy. Considerations include unit or combat loading, deployment training, use of command platforms, and the placement of TSC equipment on prepositioned sets, so that the material handling equipment, vehicles, life support equipment, AIT devices and sustainment stocks are readily available to first deployers. The cost savings of unity of effort brought by consolidating communications, material and infrastructure under a single functional, highly deployable command would be significant.

The TSC's employment of split-based operations is another method of speeding the flow through a POD. Split based operations take advantage of improved automated control systems allowing management and control functions to be performed at a location physically separate from the site of execution, thus requiring only forces in theater needed to perform the tasks. This can significantly reduce the logistics footprint in theater, especially for support units such as the TSC, thus reducing the strain on reception and staging operations.

Equipment Design

An all wheeled force would greatly reduce the burden of staging and moving equipment in theater by greatly reducing or eliminating the need for movement by heavy equipment transport trucks or by or rail. The use of wheeled vehicles would speed transitions at PODs or ISBs due to their ability to self off- load and move without truck or rail support. Wheeled vehicles would also reduce in-theater support needs (of fuel, repair parts, and materiel handling equipment) and reduce consumption of sustainment supplies.

For both the interim and objective forces, deploying systems that require less support would enhance the Army's ability to meet the 96-hour, 120-hour, and 30-day deployment timelines. The critical components of combat equipment would not fail during combat and thus would need less support. The number and types of personnel, supplies, and equipment currently deployed from the continental United States to the intermediate staging base or battlespace to sustain and maintain combat equipment would be reduced dramatically. Developing, designing and procuring future combat systems that are more survivable and thus require less logistics support will require much less effort to deploy, as well as to receive and stage. As a result, these more reliable and sustainable systems will enhance combat capability, reduce the logistics footprint, increase logistics responsiveness, and improve deployability.

Objective force systems must be lighter, smaller, more capable and sustainable. Reducing the size and weight of objective force units will allow more efficient transportability. Narrowing the "tooth to tail" ratio in a theater of operations can also reduce RSOI. A more favorable ratio of combat troops to support troops can be achieved through a variety of technological innovations, such as precision munitions, fuel-efficient vehicles, and ultra-reliable systems. The effect of these developments would be not only a smaller, lighter force to deploy, but also reduced weight of basic loads of ammunition, fuel, rations, and water. More efficient use of space through equipment that is stackable and configured for the size and dimensions of standard load pallets and containers would also reduce transportation and RSOI requirements. By maximizing lift capability and minimizing the material handling equipment requirement, use of such containers would expedite handling at a POD or an ISB.

Airlift

For the interim force, options to improve airlift and RSOI operations include acquiring more C-17 transport aircraft, and improving use of commercial aircraft through the Civil Reserve Air Fleet (CRAF). As a strategic and theater airlift platform, the C-17 provides the IBCT with the ability to bypass ISBs and fly directly into a theater of operations. The capability to bypass ISBs would potentially reduce RSOI requirement with the benefit of enablers such as ITV, SCLs and CCLs, and combat configuring available to the IBCT. The C-17's range, versatility and capacity represent the best current method to get the IBCT to theater and strategic destinations in a rapid manner. Also, the capabilities of an expanded C-17 fleet could reduce reception and staging requirements by putting forces directly into an area of operations with proper airfields and organic off-load capability.

While the use of CRAF could reduce RSOI requirements by freeing up military aircraft for theater airlift, it could also increase reception requirements due to unsuitability of CRAF aircraft for combat configured and self-unloading equipment or specialized military containers. Both politically and economically costly, the caution required to use civilian crews and assets limits the utility of its use. CRAF cannot be depended to improve RSOI because the process of notifying and activating its assets does not support the IBCT deployment timeline. CRAF's reliance upon secure, well-developed APODs also limits its utility. Thus, the use of CRAF for the interim force would only be limited to strategic deployments to robust, secure APODs, or for follow-on units to deploying to unopposed locations.

For the objective force, ULAs will have difficulty meeting deployment times less than a week, limiting their use to follow-on forces. Air speed limitations, complicated loading and unloading, en route fueling, assembly time and maneuver from points of debarkation to the combat area would all slow deployment and RSOI using ULAs. ULAs also would require special ground support equipment to off-load, adding to lift and RSOI requirements

For intertheater lift of the objective force, both the tilt-rotor aircraft and the FTR could provide the capability to rapidly transition combat loaded units to from strategic platforms, thus reducing reception and staging requirements. The capability of these aircraft to operate without improved airfield surfaces would also reduce or even eliminate the need for a POD support structure in an area of operations.

Sealift

In order to support the interim force with sealift, one feasible option would be to preposition ships with combat loaded equipment in areas of concern or deploying them provisionally upon strategic warning, thus is reducing deployment time and RSOI support. Also, APS afloat equipment can be more readily available by forward positioning it routinely in regions according to a routine schedule, as the Navy moves its carriers to crisis regions. Prepositioned equipment can also improve interoperability of the interim forces by including multi-service equipment or units and their special sustainment stocks.

For the objective force, the HSS concept could significantly improve RSOI operations. It would require little or no reception or staging in theater due to its ability to deliver combat loaded units to shallow, unimproved ports, or bare beaches. Equipped with a ramp, downloading a TSV would require little or no MHE. The maneuverability of combat configured units would also reduce the need for onward movement support, other than movement control functions. With the capability to conduct en route mission planning and rehearsal onboard the HSS, integration can be accomplished prior to arrival.

## Recommendations

Improved RSOI capability will have a tremendous impact on the ability of the Army to respond quickly to global crises. RSOI capability should be immediately improved through emerging technology in information processing, equipment design and air, sea and ground transportation. Total visibility of cargo and materiel moving from one base to final destination must be established. Designing equipment to ensure transportability in containers or platforms on standard ground transport, by airlift, withstanding ramp load, ease of off-loading by MHE would decrease the handling times for transit operations. Also, designing aircraft and ships to easily transport, load and unload equipment, to increase speed of delivery would decrease the transit times in any movement to the final destination.

Adding the capability to calculate movement and support requirements from POD to TAA to the JFAST or a similar planning tool such as the enhanced logistics intratheater support tool (ELIST) will allow for accurate forecasts for RSOI operations and evaluations of the capability of theater lines of communication to conduct RSOI. The result will be more precisely tailored RSOI requirements at the planning level, which in turn can reduce the lift requirement and the footprint of RSOI assets. Planners need such improved automated decision support tools to establish, modify, and monitor the flow of forces into the theater and beyond the POD and priority should be given to their development and fielding.

The Army should continue to develop and field a single system to provide accurate ITV and force tracking capability for deploying units. Providing near real-time information on the identity, location, and quantity of assets, ITV systems thus reducing the RSOI foot print and trim the demand on lift. Also, the continued creative design of SCLs and CCLs contents and platforms based upon validated unit requirements will improve RSOI by speeding the transition of sustainment and basic loads.

Initial entry forces and forced entry operations should employ the principles and tools of RSOI to track the build up of combat power, even if the unit is capable of supporting itself. The principles of RSOI, which focus on receiving equipment and rapidly configuring it into a combat ready force with the minimum external support necessary, directly correspond to the efficient control and tracking of forced entry operations. Also, interim and objective should employ ISBs to counter the likelihood of POD access denial and limited POD infrastructure in austere theaters. The use of ISBs will result in the more efficient use of the strategic airlift and sealift systems, particularly for follow-on forces or units of employment.

As a permanent and tailorable RSOI support unit, the TSC can improve RSOI. However, only by identifying tasks and functions that must be performed to support the interim or objective force in a specific theater, and modernizing its equipment with the same imperatives of the objective force, will the TSC be able to improve RSOI while placing less demand on lift and creating a smaller logistics footprint.

Interim and objective force units must be deployed in combat configuration to diminish RSOI. By matching equipment, soldiers and basic loads prior to deployment or at an ISB, vehicles and personnel will not have to be marshaled separately in theater and won't have to be staged to receive supplies. Combat configuration would also reduce MHE and ITV requirements, speed onward movement, and ensure that integration of units is essentially complete immediately upon arrival.

As stated in FM 3.0, training is the linchpin of strategic responsiveness (FM 3.0, 3-35). Units that train for wartime missions and conditions prior to being alerted will be better prepared to deploy rapidly and enter theaters of operations with less support. Also, JLOTS training should also be conducted on a more frequent basis and on a wider scale than currently.

Interim force and equipment designers must strictly adhere to the determined requirements for movement, such as the C-130 equivalent platform yardstick. Force designers must resist the inevitable tendency to try to marginally exceed size and weight ceilings in order to gain lethality and protection or other capabilities. This incremental increase in size and weight will threaten the maneuver and mobility efficiencies gained by the medium force design, and potentially invalidate the concept of a lighter, more deployable force.

Increasing the C-17 fleet would enhance the ability of the IBCT to meet its ninety-six hour timeline and provide for feasible airlift for follow-on logistical requirements. An increased C-17 fleet would also serve as theater lift for unopposed or follow-on operations. This improvement is that it can be achieved relatively quickly because both the design and industrial base are already proven.

Recommendations for reducing RSOI requirements for the interim and objective forces through improvements in sealift include reconfiguring the prepositioned fleet into combat configured sets of interim and objective force equipment and forward basing it for quicker delivery. Also, HSS should be added to the inventory to give theater commanders greater flexibility in entering a theater with minimal or no RSOI requirements.

Prepositioned equipment can reduce RSOI requirements but only if it the equipment aboard the APS fleet is updated and the methods for its use are improved. Specifically recommended are the use combat configured sets of future combat systems, which are forward based upon initial threat increase. The prepositioned fleet should also include TSC port-opening packages, built-in ITV capability and the use of multi-modal systems to speed transition. These improvements in prepositioned equipment would reduce reception and staging by shrinking the effort required to bring it ashore and by guaranteeing early arrival of port-opening equipment.

Adding the capability of the HSS would significantly improve RSOI operations by speeding reception and staging, as well as integration for initial entry forces. The HSS's capability would complement airlift by moving entire combat configured units long distances at relatively high speeds, and to rapidly off-load them in unimproved ports. The ability to conduct en route mission planning and rehearsal onboard HSSs would further contribute to the improvement of RSOI.

## Areas for Further Research

This thesis has addressed a variety of related topics that merit further research. Although not suitable for thorough analysis here due to their scope, examination of the topics described below could further improve the strategic responsiveness of future forces.

Analysis could be conducted to test the proposed doctrinal, procedural and organizational RSOI changes through a series of modeling and simulation events, comparing timelines using current processes and currently available systems and proposed processes and systems to evaluate the potential effectiveness of RSOI for interim and objective forces.

Redeployment of the interim and objective force is an area in need of evaluation. Study of this topic could examine how to best conduct redeployment from a theater of operations to a new theater of operations for employment, or when returning units to their home or demobilization stations. The same operational phases, planning, and coordination actions required for deployment are also required for redeployment. The potential exists to consider that both forces will be able to redeploy without assistance due to the efficiencies gained by their force and equipment design. There are, however, many support tasks that neither force will be likely to have the capability to perform unaided, nor which may not be resident in an area of operations due to the effort to maintain a small footprint. Potential solutions include use of the TSC, as well as host-nation and contract support.

Another topic to consider is the sustainment flow for the interim and objective force, specifically intertheater and intratheater distribution. Additionally, the interoperability of future RSOI operations merits further study. Interchangeable equipment and standardized planning tools, processes and organizations, and compatible information gathering systems and knowledge management tools are essential to ensure that future RSOI operations enhance the strategic responsiveness and agility of joint force commanders. Also, the question of how to tailor the APS fleet for the interim and objective forces should be examined. Finally, one might consider how to improve RSOI for combined operations, specifically applying processes and enablers designed for US forces in the conduct of RSOI for coalition forces.

## Summary

RSOI, the critical link between strategic mobility and tactical maneuver, can be significantly improved in order to effectively and efficiently entry operations of the interim and objective forces. Achieving the force projection objectives of the transformational Army requires decisive operations to be conducted "so rapidly that the enemy is defeated before he can effectively confront US forces (FM 3.0, 3-40)." To support this objective, the fundamental RSOI processes will be necessary to expedite the transition of troops and material into ready units. The question, then, becomes not whether RSOI will be conducted but how and where.

Prior to the development of RSOI, deployment planners were concerned principally with movement of forces from ports of embarkation to ports of debarkation. This limited look at deployment led to bottlenecks and other inefficiencies that dramatically slowed the buildup of forces. The introduction of RSOI doctrine helped to speed the incremental build up of combat power. Discarding RSOI doctrine and the efficiencies it brings to force projection risks reversing these gains. The Army must expand its view of the application of RSOI processes and principles beyond the theater of operations so that its functions can be performed before and during deployment. Combining the enablers in force and equipment and design discussed above with the capability to conduct RSOI processes prior to arrival in theater, will allow interim and objective force units to more rapidly enter a theater of operations, transition immediately to operations, and receive augmentation and sustainment.

For initial entry forces, RSOI requirements will be diminished or eliminated. For follow-on forces, especially for sustained operations, RSOI will still be vital. By continuing to update RSOI policy and doctrine, reshaping force structure, transforming lift and leveraging information technology, RSOI procedures and principles will provide invaluable support for future deployers. Reducing the demand for lift, refining unit deployment configuration and training, and shrinking the logistics footprint, will ensure that RSOI remains a relevant construct for improving, rather than impeding, future deployments. Transforming these deployment processes and systems through continued research and innovation will produce increased strategic responsiveness of the interim and objective forces.

# APPENDIX A

## KEY LESSONS AND TACTICS, TECHNIQUES AND PROCEDURES FROM OPERATION JOINT GUARD AND OPERATION JOINT ENDEAVOR IN BOSNIA AND HUNGARY, AND EXERCISE INTRINSIC ACTION IN KUWAIT

1. When setting up a Marshalling Area, the following planning factors should be used:

- Holding area square footage required = Ship cargo square footage x4x no.of ships per a week's flow.
- Staging area holding requirement = Holding area required vicinity port.
- Tentage requirement = Arriving personnel x Average stay at staging area + 50 percent.
- Sign requirement = No. of arriving units (CO level) x 3.
- Strip maps required = No. of units (CO level) x 15.
- Hot meals per day = (No. of arriving + no. of staging - no. departing) x 2.
- Travel time to key areas in Marshalling Area. (Entry point through to all stations)
- Latrine requirement = No. of soldiers/30.

2. Rules for Supporting Units:

- Do everything by unit - move your customers by unit, not by individual.
- Greet and brief commander at APODs.
- Give units Start Points/Time (SP) from staging area to the Tactical Assembly Area (TAA).
- Signs, signs, and more signs.
- Maps, maps, and more maps.
- All unit headquarters at unit staging base must be on net (bde/bn level).
- Containers should be restricted to areas with appropriate people or equipment handlers (55B ammunition handlers, forklifts).
- Daily meeting with all affected units (updates to schedule and situation).

3. Rules for Deploying Units:

- Meet time schedules (make SP and meeting times and follow the training schedule).
- Attend all daily meetings.
- Maintain radio net (24 hrs).
- Track and report incremental buildup of combat power.
- Maintain a TOC.
- Manifest some mechanics toolboxes as TAT (To Accompany Troops).
- Ensure one set of keys travels with vehicles and that the location of a second set is known and available throughout the RSOI process.
- Identify critical people as initial deployers and have backup personnel identified and trained.
- Vehicle Markings: In addition to stenciled vehicle markings and bar-code labels, clearly mark vehicles in a conspicuous location so that they can be identified temporarily from a distance (signs in front windows, affixed to trailers, on track vehicle turrets).

Source:  CALL Newsletter No. 99-17, II-2.

## APPENDIX B

## ARMY PRE-POSITIONED STOCKS LOCATIONS

The Army pre-positioned stock (APS) is materiel amassed in peacetime to meet the increase in military requirements at the outbreak of war. APS remains set at the minimum level of stocks to sustain and equip the approved forces as outlined in the Defense Planning Guidance. APS consists of the following:

APS-1 - CONUS (land):

Consists of Army Pre-positioned Sets (APS), and prepositioned materiel (end items, secondary items, and supplies) stored in unit sets to reduce force deployment time, and Army prepositioned operational projects (APSOP), that provide materiels tailored to provide key strategic capabilities essential to the Army's ability to execute its Force Projection Strategy.

APS-2 - Europe/Central Region 1(land):

A sub-element of Army Prepositioned Stocks that consists of two armored battalions and one infantry battalion (mech) force projection packages, stored in unit sets to reduce force deployment time. The operation is based on the concept of airlifting personnel from an Army heavy brigade and its support elements into a theater to link-up with its equipment and supplies at the prepositioned land site.

APS-2 - Europe/Central Region 2 (land):

A sub-element of Army Prepositioned Stocks that consists of two armored battalions and one infantry battalion (mech) force projection packages, stored in unit sets to reduce force deployment time. The operation is based on the concept of airlifting personnel from an Army heavy brigade and its support elements into a theater to link-up with its equipment and supplies at the prepositioned land site.

APS-2 - Europe/Italy (land):

A sub-element of Army Prepositioned Stocks that consists of two armored battalions and two infantry battalion (mech) force projection packages, stored in unit sets to reduce force deployment time. The operation is based on the concept of airlifting personnel from an Army heavy brigade and its support elements into a theater to link-up with its equipment and supplies at the prepositioned land site.

APS-3 - Gulf/Diego Garcia (afloat):

APS-3 is a sub-element of Army Prepositioned Stocks. It consists of force projection packages that can be repositioned quickly in response to a crisis anywhere in the world. The APS-3 operation is based on the concept of airlifting personnel from an Army heavy brigade and its support elements into a theater to link-up with its equipment and supplies prepositioned aboard APS-3 ships. Its mission is to project a heavy brigade force into theater for a crisis that is capable of complementing other early arriving forces, rapidly reinforce the lodgment, opens the ports for follow-on forces, protect key objectives, and support other military operations. An APS-3 is global in nature, joint in character, and suitable for employment in a variety of situations.

The APS-3 ship fleet consists of categories of equipment tailored to meet specific CINC, geographical, or common-user requirements. It has sufficient equipment on board to equip and sustain: a heavy brigade with two armored and two mechanized infantry battalions, a division slice of CS/CSS units, a corps support group, a composite transportation group, and miscellaneous equipment designated to support port opening and the establishment of the reception, staging, and onward movement operations and thirty days of sustainment supplies. An APS force may employ its basic package in support of a humanitarian mission or all of its capability to support a major theater war.

Current APS-3 Fleet:

There are fifteen ships in the APS-3 fleet that carries the equipment for the combat brigade and its support elements. It includes port opening equipment, sustainment stocks, and ammunition for a contingency corps of five and a third division.

Currently, there are three lighter aboard ships (LASH), two heavy lift preposition ships (HLPS), two container ships, one "T" class auxiliary crane ship (T-ACS) and seven large-medium speed roll on/roll ff (LMSR) ships.

The three LASH ships currently in the fleet, GREEN HARBOUR, GREEN VALLEY, and the JEB STUART, have aboard barges and containers with Class I, Class II, Class III (P), Class V, Class VIII, reverse osmosis water purification unit (ROWPU), and an inland petroleum distribution system (IPDS). Currently, the general cargo onboard the LASH is currently in the process of being trans-loaded onto converted container ships, and will only carry Class V. Upon completion of the transloads, the LASH ships will return to the ready reserve fleet (RRF).

The AMERICAN CORMORANT and the STRONG VIRGINIAN are heavy lift prepositioned ships (HLPS). These HLPS ships have aboard Army watercraft and materiel handling equipment (MHE) for port opening operations.

The SS GOPHER STATE is a self-sustaining Military Sealift Command (T-ACS) T-class auxiliary crane ship. Its' mission is to off-load containers and other outsized cargo from non self-sustaining cargo ships offshore, or at bare or underdeveloped ports.

The MV LTC TITUS and the MV SPC GIBSON are container ships in the fleet. Both ships have two cranes, sixty 220-volt reefer container locations, a total TEU capacity of 1672 and 45,000 square feet of space for roll-on/roll-off equipment.

The six LMSR s, are the GORDON, SHUGHART, YANO, GILLILAND, WATSON, and BOB HOPE, that carries the bulk of the heavy brigade's equipment. By the year 2002, there will be sixteen LMSR vessels in the APS-3 fleet. Ship rotations will occur throughout the years until end-state. The CAPE DOUGLAS is the only ready reserve force roll-on/roll-off ship in the active APS-3 fleet.

APS-4 - KOREA (land):
A sub-element of Army prepositioned stocks that consists of two armored battalions and one infantry battalion (mech) force projection packages, stored in unit sets to reduce force deployment time. The operation is based on the concept of airlifting personnel from an Army heavy brigade and its support elements into a theater to link-up with its equipment and supplies at the prepositioned land site.

APS-5 - SOUTHWEST ASIA/Qatar (land):
A sub-element of Army Prepositioned Stocks that consists of two armored battalions and one infantry battalion (mech) force projection packages, stored in unit sets to reduce force deployment time. The operation is based on the concept of airlifting personnel from an Army heavy brigade and its support elements into a theater to link-up with its equipment and supplies at the prepositioned land site.

APS-5 - SOUTHWEST ASIA/Kuwait (land):

A sub-element of Army Prepositioned Stocks that consists of two armored battalions and one infantry battalion (mech) force projection packages, stored in unit sets to reduce force deployment time. The operation is based on the concept of airlifting personnel from an Army heavy brigade and its support elements into a theater to link-up with its equipment and supplies at the prepositioned land site.

Source: Deployment Process Modernization Office, 25 May 2001, FT Eustis, VA. Accessed at http://www.deploy.eustis.army.mil/Ops&Training/APS.htm.

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