



**STRATEGY
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PROJECT**

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**LOGISTICS TRANSFORMATION – REDUCING
THE LOGISTICS FOOTPRINT**

BY

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LOGISTICS TRANSFORMATION-REDUCING THE LOGISTICS FOOTPRINT

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ABSTRACT

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Logistics doctrine, methods, skills, force structure and procedures must be analyzed and potentially radically modified to reduce the Logistics Footprint. This paper will examine current logistics doctrine, method, and procedures, organizational relationships and infrastructure. The author examines how reduction of the Logistics Footprint will impact the direction of the current transformation, and the path to focused logistics as the transformation endstate. The reduction of the Logistics Footprint will be facilitated through a systems effort and review. Enablers such as mobility, real-time IT links, forward positioning and redistribution will be reviewed for value and applicability toward down sizing the Logistics Footprint.

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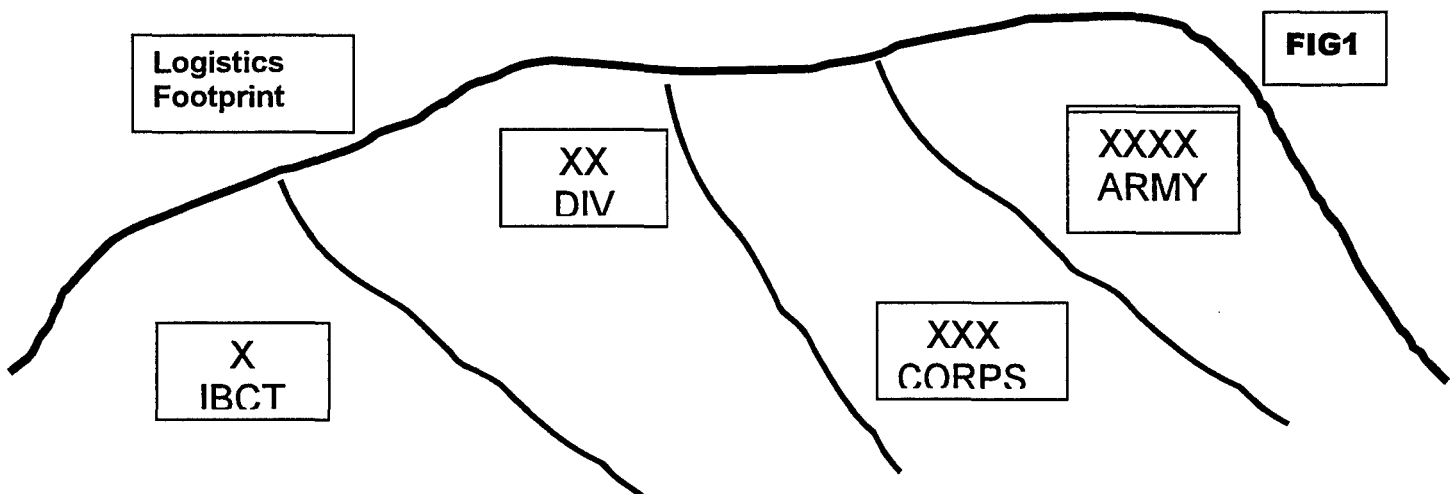
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LOGISTICS TRANSFORMATION-REDUCING THE LOGISTICS FOOTPRINT

The Army's Transformation and Vision of the 21st century warfare will require significant change from across the force. All elements of the Army to include branches, functions, active and reserve will require some form of transformation or change including logistics. In fact the Chief of Staff of the Army (CSA) has indicated, "At this point in our march through history, our heavy forces are too heavy and or light forces lack staying power. Heavy forces must be more strategically deployable and more agile with a smaller logistical footprint, and light forces must be more lethal, survivable and tactically mobile."¹ It is this reduction in the logistical footprint that is driving the logistical transformation. To achieve this footprint reduction changes must come from across the spectrum to include organizational structure, doctrine, technology and hardware. Included in the Army's transformation direction by Chief of Staff of the Army "Soldiers on point for the Nation...Persuasive in Peace, Invincible in War" with the goals to become more Responsive, Deployable, Agile, Versatile, Lethal, Survivable, and Sustainable indicate a different force from the Cold War era"². This is a force that's mobile, powerful, quick, probably smaller and not limited to a particular environment. These new aspects of the future Army are critical however; the reduction of the logistics footprint is vital to the logistician and paramount to achieving the CSA's desired endstate.

THE LOGISTICS FOOTPRINT

As the Chief of Staff of the Army shapes and defines Army Transformation logisticians must focus on their responsibilities in obtaining logistical transformation endstate. So, what are the outside drivers in this logistical or sustainment reduction? Why is this logistical footprint significant? What is this logistical footprint and how big is it? How does the Army plan on obtaining this reduction? The logistical footprint is defined as "the physical presence of CS/CSS (Combat Support/Combat Service Support) oriented equipment, supplies, personnel (including contractors & civilians), and infrastructure within a given combat zone."³



Joint Pub 1-02 indicates that the combat zone is "the territory forward of the Army rear boundary"⁴. Hence, within the battlefield framework or in typical Theater of Operations the logistical footprint extends forward from the Army rear boundary through the Corps area, through the Division and Brigade areas down to the combat arms battalion and their related combat trains level where the presence of any CS/CSS functions ends and a pure combat force remains. Within the current legacy force structure this logistical footprint starts with the Theater Support Command and extends down to the combat arms platoon level where possibly medics, mechanics and communication soldiers are employed. In current legacy force terms both size and force structure this logistical footprint is massive. It could be hundreds miles from front to back and just as wide, and could potentially triple or more in the objective force environment. In terms of support structure the logistical footprint within the combat zone includes the DISCOM, COSCOM, EAC and Theater Support Command forces. The final element of the footprint is the stuff or supplies consumed by the supported force. The supported theater army force usually consists of 2 to 3 Corps plus common-user logistics to support the other services.

LOGISTIC HISTORY

If one was to take a look back recently on the US Army and its logistical efforts to defeat the Iraqi Army in the early 1990's a mammoth logistical base or footprint was established prior to the ground war. In fact looking at each of our previous major wars between 1941- 1991; WWII, Korea, Vietnam, and Saudi Arabia it took the United States about 90-100 days to get the first million tons of supplies into theater, the high water-mark being Vietnam in 1965 with 1.3 million tons in the first 90 days.⁵ Hence, since the beginning of WW II we have executed our logistical plans in support of the warfighter in nearly the same fashion by building a large logistical footprint in theater prior to beginning significant ground operations.

To take a closer look at the significant elements of this logistical footprint and actual numbers in support of the 300,000 troops deployed to the desert in Operation Desert Storm it took 6 months to deploy nearly 2 million short tons of supplies and equipment prior to the US Army's major ground operations. To break down the three major supplies of rations, ammunition and fuel the footprint build-up in late 1990 to early 1991 consisted of 122 million meals of class I 138,000 ST, or 29 Days of Supply (DOS), 630,000 Short tons of class V (ammunition) or 45 DOS and 1.3 billion gallons 651,000 ST of fuel or 5 DOS⁶. The total equals to at least 71% or 1.42 million Short Tons of what was shipped into the South West Asia (SWA) Theater making up the initial logistical footprint. It can be said that for at least the last 60 years the US Army has

employed a mass based logistical system moving very large stocks of supplies, personnel and organizations to support any form of ground combat operation.

JOINT & OTHER SERVICE LOGISTIC VISIONS

However, the task of reducing this huge 'Iron Mountain' supply system is only one of a number of factors driving the logistical footprint reduction. To achieve the CSA's objective force endstate other key factors such as strategic lift, cost, technology, and automation information management are other potential enablers that will aid in reducing the logistics footprint. Additionally, Joint Vision 2020 establishes Focused Logistics as the format for conducting sustainment operations in a joint environment. Focused Logistics through mutual Service efforts indirectly subscribes and supports to a reduction to the logistics footprint. Focused Logistics envisions effective and efficient support without the redundant efforts or costs from previous logistic systems

Focused Logistics is the ability to provide the joint force the right personnel, equipment, and supplies in the right place, at the right time, and in the right quantity, across the full range of military operations. This will be made possible through a realtime, web-based information system providing total asset visibility as part of a common relevant operational picture, effectively linking the operator and logistician across Services and support agencies. Through transformational innovations to organizations and process, focused logistics will provide the joint warfighter with support for all functions.⁷

Focused Logistics from Joint Vision 2020 (JV2020) combined with CSA's Vision indicate a more sustainable and agile force operating within a reduced logistical requirement. Both visions are a result of a need to further develop and enhance our sustainment methods and move away from a mass-based logistical system while establishing a force that is more agile, deployable, and flexible to cope with a vastly increased battle space. Focused Logistics also connects the warfighter to the military Services so sustainment requirements are precise and time definite while also eliminating the need for the just-in-case 'Iron Mountain' supply points. Additionally, the Air Force in 2001 has launched a similar logistics footprint reduction effort. The Air Force Vision indicates a core competency of their Vision is,

We'll continue to improve our strategic agility, providing the mobility to rapidly position and reposition forces in any environment, anywhere in the world. At the same time, our combat support will become more agile. We will streamline what we take with us, reducing our forward support footprint by 50 percent. Fast, flexible, responsive, reliable support will be the foundation of all Air Force operations.⁸

From rapid mobility to flexible & responsive support to a 50 percent reduction in the support footprint these aspects in the Air Force's Vision are nearly identical to the CSA's Vision. From a logistician's perspective, the CSA's Vision and the Air Force are in concert and moving toward JV 2020 in harmony. Additionally, prior to the CSA Vision and JV 2020 the 1997 National Defense Panel indicated that military forces in the year 2020 needed the following characteristics: robust information systems & network architectures, small logistics footprints, mobility, stealth and speed.⁹

The Quadrennial Defense Review (QDR) of 2001 address the transformation in DoD's sustainment Community with the following four primary objectives; DoD will pursue actions to sustain the force more effectively and efficiently. ...1) improved deployment process...2) accelerated implementation of logistics decision support tools...3) reduced logistics demand, and 4) reduce the cost of logistics.¹⁰ The CSA's Vision and transformation to a reduced logistics footprint clearly encompasses Joint Vision 2020, Air Force Vision, and the National Defense Panel's guidance while also capturing the essence of the QDR's sustainment guidance. Reducing the mass of supplies or 'Iron Mountain' buildups related to previous Army ground operations will indirectly improve the deployment process, and reduce costs. To achieve the Army's transformation endstate the Army Staff has published a US Army Transformation Plan (ATP) and Line of Operation 9 (LO 9) of the plan is Deploying & Sustaining.¹¹ A closer break down of LO 9 indicates three specific Combat Support/Combat Service Support (CS/CSS) goals:

- 1) Reduce the CS/CSS Demand on Lift
- 2) Reduce the Deployed CS/CSS Footprint in Battle Space
- 3) Transform the Institutional CS/CSS Components to be more strategically responsive¹²

Additionally, the Army Transformation Office has targeted January 2008 as the primary milestone date to meet the Deploying & Sustaining goals of LO 9 with the interim force.¹³

The tasks and goals of Army Transformation placed before the logistics community are daunting. But the CSA guidance is clear 'It needs units that can deploy fast with small logistics requirements.'¹⁴ To meet these goals and get there by 2008 the Army must take advantage of science and technology breakthroughs to create the next generation of equipment, doctrine, and organizations. These same enablers will help shape the logistics systems and organizations to achieve the CSA's envisioned endstate. To provide greater agility, responsiveness, and sustainability to the future force, logisticians must embrace and harness information/automation improvements, force structure changes and technology breakthroughs. The sustainment

community can no longer perform as a multi-layered supplybased force. No threat will sit idle and allow for six-month sustainment buildup as experienced in Operation Desert Storm.

The logistics footprint reduction is a deliberate and focused effort utilizing a wide range of enablers and sustainment multipliers. The future theater logistic footprint will be built upon state of the art information technology and use a distribution based logistics system that facilitates the elimination of intermediate stockpiles. This reduction in stocks reduces logistical units deployed and overhead required to handle and supervise the multiple stockpiles while enhancing agility, responsiveness, and maintaining sustainability. To perform the sustainment missions of the objective force the Army's logistical organizational structures require a complete review and overhaul.

LOGISTIC ORGANIZATIONS

The Army is all about people and the units that execute its tough missions. The first step in reducing the logistical footprint is streamlining our organizations. Logisticians must consider significant changes to our CSS organizational structure - Support Battalion, DISCOM, COSCOM, Theater Support Command (TSC), and Army Material Command (AMC). The design of our current or legacy support structure was based upon the old heavy force with a primary mission focused at Eastern Europe. The CSS force structure was designed to manage multiple piles of stuff or the redundant 'Iron Mountains' that currently make up the legacy logistic footprint. However, in addition to our heavy-force method of sustainment a simpler but greater issue resides within in CSS structure- it has no single boss.

LOGISTICS LEADERSHIP

The logistics community has no single organization or commander in charge. A quick look at today's Unified Command Plan (UCP) and supporting logistics community indicates we have a number of regional Commanders In Chief (CINC's) working their sustainment efforts independently. The CINC's work the 'Iron Mountain' support system in attempt to obtain as much sustainment resources as possible within budget constraints. In effect each region or CINC is competing for similar resources and building their logistical footprints or 'Iron Mountains' in preparation for future military operations within their region. But no single commander or organization is overall in charge of the total logistic process at the national level. Even if there were no Army Transformation and logistic leadership elected to keep the 'Iron Mountains' of

stuff methodology, logisticians, need someone in-charge to establish priorities, sets limits, and reallocate resources if required. To put it plainly " Ideally the Army should have a single sustainment chain of command from the strategic level to the tactical level.⁴⁵

Currently Army Materiel Command (AMC) is the senior logistics organization but has minimal impact on the logistician at the Theater level or below i.e. within the defined logistical footprint. In fact "many view the AMC as a vast outdated monolith, deeply rooted in wholesale logistics and rigid institutional practices that have lost touch with the warfighter.⁴⁶ Wholesale logistics and the separation between wholesale and retail stocks is a heavy legacy forces carry-over and must be eliminated. AMC must be redesigned, restructured and refocused to act as the senior logistic focal point for the Army and link themselves back to the deployed soldiers operating within a given theater logistics footprint. During a conference at the Industrial College of the Armed Forces (ICAF) last year (2001) the answers or directions to AMC's current struggles were addressed when the group took a look at logistics across the United States from both a commercial and military perspective. The basic question and answers capture how AMC must transform to become a relevant logistic organization fully supporting the objective force. The ICAF conference provided four elements to the question

What are the key tools that will make a difference in Logistics?

- 1) Fostering changes to culture
- 2) Integration of modernization
- 3) Overcoming stovepipe organizational constraints
- 4) Overcoming regulatory/financial/appropriations cycle constraints¹⁷

These solutions to the generic 21st century logistics struggles apply directly to AMC's current deficiencies and shortcomings. There is no magic or surprise here, but basic organization improvements and efficiencies that AMC must undertake to act as CINC Logistics for the transformed force.

HISTORICAL LOGISTICS LEADERSHIP

The idea of a single Department of Defense logistics organization overall in-charge is not new. During both WWII and the Korean War, the War Department established the Overseas Supply Division (OSD) an organization that worked directly for the Pentagon in the management and allocation of supplies and services.¹⁸ The OSD was not perfect, but fulfilled a key role in the

execution of world-wide logistic allocation. The organization was not fully multi-service or joint however, logistic operations were issued with one voice and "many War Department responsibilities for theater resupply were concentrated in one agency to which a theater commander (CINC today) could look to fill his needs."¹⁹ During the 1940's and 1950's there was an understanding that resources were limited and someone needed to allocate and prioritize these finite assets. Today the logistics community lacks focused leadership from the top. Additionally, with the vast increase in the use of automation and network technology within the logistics community will require:

The creation of a logistics component C2 capability in each operating theater. Placing 'someone in charge' is valuable by itself, but when combined with the power of the information we (DOD Science board of 1998) propose to provide, this new command component will be able to achieve the needed improvements and command focus.²⁰

The final step here is to recommend what the new 'in charge' organization would look like. It would consist of the functions indicated above in the old OSD, current AMC facilities (including depots, arsenals, and Army Pre-positioned Stocks [APS]), Installation DOL's, AMSA and MATES (US Army Reserve and National Guard Maintenance Facilities) and Military Traffic Management Command (MTMC). This new organization would act as CINC Logistics at the Army level integrating the capabilities of DLA, TRANSCOM, and LOGCAP while fusion at the joint level also takes place. The new organization would be called Army Level Support Command (ALSC).²¹ Additionally, ALSC would have Army wide sustainment visibility and through the use of Single Stock Fund (SSF) and National Maintenance Management the concept of CINC logistics would become reality.

NEW LOGISTIC ORGANIZATIONS

However, this proposed organizational change at the Army level is only a partial solution to reducing the logistic footprint. The ALSC can control and prevent the 'Iron Mountains' and piles of stuff from growing in each theater. The next structure change need to take place within our logistics footprint or in current Joint Pub terms forward of the Army rear boundary. Reviewing our current structure and doctrine and using ammunition (CL V) as an example one can see that including the Port of Debarkation (POD) that CL V will get stockpiled at multiple locations to include within the Army sector, Corps sector and Division sector.²² And guess what? - We've got a current logistical structure to manage all of the piles. Eliminate most of the

stockpiles, and flatten the organization and the logistical footprint will be reduced within a theater.

Again, using ammunition or CL V as our example, once the supplies are in theater eliminate multiple Theater Storage Areas (TSA), the Corps Storage Areas (CSA), and Corps Ammunition Supply Points (ASP) for the ammunition. Supplies such as ammunition only need to be stored at key distribution locations. A similar analogy can be made with repair parts (CL IX) and the multiple Supply Support Activities (SSA), Fuel (CL III), and subsistence (CL I) supply points. Without all the 'Iron Mountains' or storage locations within the theater the footprint could be reduced by 30-70%. The transformed and flattened logistical organization to execute these sustainment functions would be a fraction of the old Theater Support Command (TSC) units, the Corps Support Command (COSCOM), and the Division Support Command (DISCOM). This new organization could be called the Theater Expeditionary Support Command (TESC) consisting of Theater Support Groups (TSG) and Theater Support Battalions (TSB). The TESC would perform all the required sustainment (CSS) functions that the COSCOM and TSC units previously executed but on a greater distributed fashion and from a single compressed organization at a fraction of the former units size. With an efficient and effective logistic operation the COSCOM and for the most part the TSC are middlemen with little value in the process. In fact " continued analysis (by Logistics Interrogation Agency) may indicate that many logistical bottlenecks and inefficiencies are found at the theater army and corps level where units seem to pass along supplies to each other before ultimate delivery to tactical end users. "23 The TESC would also be directly subordinate to the ALSC establishing the link and chain of command required between the national level and 'CINC Logistics'.

The final CSS organization in our transformed logistic structure is the Brigade Support Battalion (BSB). The interim BSB currently in development to support the Interim Brigade Combat Team (IBCT) is 60% smaller, 382 soldiers compared to the 955 soldiers required in the legacy-heavy Forward Support Battalion (FSB).²⁴ Therefore from the IBCT sector to the Division Rear boundary a 60-75% reduction in CSS organizational structure can be obtained with the BSB and loss of the DISCOM overhead. The BSB's would be subordinate to the TSG's and habitually OPCON to their supported IBCT.

The TESC and its subordinate TSG's, TSB's, and BSB's would be the new logistics structure constituting the transformed deployed footprint. Again going back to our ammunition resupply example- we've eliminated almost completely the COSCOM function of Corps ammunition storage within an Army Theater of operations. Repeating this process for CL I, II, III,

IV, and IX we obtain at least 50% CSS force structure reduction forward of the Army rear boundary.

MEDICAL ORGANIZATION CHANGES

In addition to the proposed force structure changes the medical community has been also diligently working to reduce its legacy-heavy force structure. The Army Medical Department (AMEDD) has been working its Medical Reengineering Initiative to replace its current 296-bed Combat Support Hospital (CSH) with a smaller, agile 84-bed hospital.²⁵ This is over a 70% reduction in the CSH size deployed within the Army and Corps sector. This significantly reduced Force Health Protection (FHP, formerly Combat Health Support) footprint will be facilitated and augmented by a robust and rapid evacuation of patient's effort.²⁶ Again, as indicated in supply transformation the medical community is also transforming from large stocks or 'iron mountains' within the battle space to smaller deployable units while relying on transportation or movement as a key enabler in facilitating the reduction in FHP footprint. Finally, at the IBCT level the legacy force Medical Company found in the FSB is being reengineered into what I call Forward Medical Support Detachments (FMSD). These FMSD's will be made up of TreVac teams consisting of

4 person multi-capable teams [about 1 ea team per supported battalion] (providing) advanced trauma management, limited preventive medicine services, routine sick call, limited dental, radiological, and laboratory services, and extensive ground evacuation services.²⁷

This roughly 30 soldier FMSD (5 teams X 4 soldiers per, plus 20% C4) also equates to a 65-70% reduction of medical assets within the logistical footprint at the IBCT level.

The legacy or 'Iron Mountain' logistics force structure has served us very well over the past 50 years. Those sustainment heroes achieved greatness by 'moving mountains' to quote LTG Pagonis of Desert Storm fame. However, times have changed, speed, flexibility and agility combined with lethality is the future of armed ground conflict, and those legacy logistics force structures must transform in similar fashion to ensure success on the battlefield. The logistics community must reform its two-tiered wholesale - retail structure at Army Materiel Command (AMC) and make it a single seamless Army Logistic Support Command with fixed leadership at the top. The leadership must facilitate the prioritization, direction and allocation of limited resources throughout the globe.

Finally, the logistics force structure deployed within a given theater needs to be compressed. The new structure will not rely on the methodology of multiple storage locations

throughout the Army and Corps sectors. Supplies will move into theater and then directly to the Brigade Support Battalion (BSB) removing the middlemen and thereby reducing the footprint. The medical community has also taken a reduced, agile, approach to its Combat Support Hospitals and forward medical treatment organizations. Our future enemies will not allow us the time to build those iron mountains of supplies, and most importantly the warfighter's transformed force requires a smaller logistics footprint with characteristics of agility, speed and flexibility. Conservatively a 65% reduction in the deployed logistic structure can be achieved through these structure changes combined with enablers of doctrine and methodology. Force structure changes must be top priority in logistics transformation " organizations rarely will fundamentally change from within... transformation must come from visionary leadership.²⁸ In summary the logistics transformation and reduction in footprint must start with changes to the organization and force structure. The desire and willingness of today's Army logistical leadership to execute force structure changes will demonstrate a firm commitment to Army Transformation.

ARMY LOGISTIC SYSTEM

To achieve a reduced logistic footprint and facilitate a compressed and reduced CSS force structure doctrine and procedures must also change. In fact one of the key focal points of logistic transformation is the fundamental transition from a supply based (mass) logistical system to a Distribution Based Logistical (DBL) system.²⁹ Distribution based logistics (velocity & precision) eliminates the stockpiles of supplies throughout the supply system, most notably within a given theater of operations. This move to DBL is not completely new. Since 1995 the Army's logisticians have been exploring the benefits of Velocity Management (VM)³⁰ a core concept and foundation to DBL. Following the Gulf War of 1991 senior Army leadership quickly assessed that few future enemies would allow six months of stock age buildup prior to the initiation of an operation. Additionally, these huge 'Iron Mountain' stockpiles made lucrative targets on the battlefield, while also consuming resources to protect and move. The mass logistical system anchored the warfighter to cumbersome systems and organizations that detracted in nearly every aspect that the warfighter wanted to employ such as mobility, rapid maneuver, and deploy ability.

Over the past seven years the Army has made great strides in the use of VM and execution of DBL and these concepts have allowed the shipping time of materials to be reduced by over 50%. Today the mean overseas supply request is shipped and received in about 12

days including to new theaters such as Bosnia/Kosovo.³¹ During WWII the order and ship time was about 120 days.³² Hence, through the benefits of DBL the Army has now one tenth the order and ship time required in delivering parts to our deployed forces, or potentially 10 times the delivery capability. Going back to the examples of ammunition or repair parts and incorporating the benefits of Distribution Based Logistics system reduction of the stockpiles or Iron Mountains by 50% is clearly achievable. Finally, the logistic community should have an early indicator on the effectiveness of a DBL system as Defense Logistics Agency (DLA) reduces its number of storage locations by 60% (47 down to 19) between 2000 and 2005.³³ This footprint reduction outside of our focused area will be a key indicator in the Army's ability to meet the warfighter logistic requirements with fewer stock age locations based upon a robust distribution network.

The plan to transform logistics across DoD to a Distribution Based Logistics (DBL) system is not new. Since 1997 this has been a challenge and primary focus of the Defense Reform Initiative, but the efforts to date are not fully favorable. The coordinated logistics plans to develop and transition to a DBL system by the services to a joint environment by Defense Logistic Agency (DLA) and U.S. Transportation Command (USTRANSCOM) lacked cohesion, were under funded, and did not establish uniform specific sub goals and objectives.³⁴

The Army fully acknowledges that a DBL system is the centerpiece to logistics transformation and one of the keys to reduction of logistics footprint. DBL clearly enhances a reduced logistics footprint and is essential to the successful employment of a compressed logistics force structure. Movement and distribution will replace the redundant stock age locations in the Corps, Division Rear, and Army levels. To enable DBL a robust automation/Information technology package is also required. To support the Warfighter with confidence that multiple stock locations are not required automation has to provide trust in the DBL system that future requirements can be obtained and quickly and effectively while not limiting the plans and missions of the maneuver element. Critical to the Army's transition to DBL and a smaller footprint is the codification of our transformation through doctrine.

LOGISTIC DOCTRINE

The Army's logistical doctrine must support transformation across the sustainment spectrum to include force structure, methods including DBL and integration of technology into the objective force. The Army's logistical doctrine will not only focus on methods and

procedures in sustaining the objective force but also facilitate the warfighters integration of CSS capabilities into operational and campaign planning. New doctrine must focus on operational logistics consisting of both Title 10 requirements and the warfighter requirements.³⁵ However, the newest of Army doctrine, FM 3-93 Army Theater Operations, Oct 2001, does little to begin to transform doctrine away from legacy force procedures. The new manual highlights the logistical success of Desert Storm and the 41,000 soldiers of the 22nd SUPCOM that had nearly 60 DOS on the ground to facilitate the ground war.³⁶ This is not the vision or concept the Army should be using to support the objective force. As indicated in this document 41,000 soldiers in the Support Command along with its balance of 60 DOS on hand within the logistical footprint is huge and is based on multiple stock locations in support of the legacy force. The Army's doctrine must emphasize a much smaller logistics footprint with only essential forces and minimal deployed stocks. 60 DOS in the theater of operation is clearly a risk reduction enabler against worse case enemy capabilities. Additionally, U.S. Army FM 3.0 Operations is also written without transformation content and is directed at a legacy force logistic system. The logistic system is mass centric and indicates how the "CSS personnel plan for and prepare the essential theater infrastructure to establish the support base."³⁷ New Army logistical doctrine must focus on the DBL system and remain agile and responsive without the establishment of 'Iron Mountains'.

INTERMEDIATE STAGING BASE

Our logistical doctrine of the objective force has got to focus on agility, speed, effectiveness and efficiency. To provide the risk mitigation if desired by the Warfighter with additional sustainment capability the concept of Intermediate Staging Base (ISB) is an option. The ISB provides a number of valuable capabilities to the logistician while limiting the expansion of the logistical footprint. Army doctrine must indicate that an ISB is driven by a number of factors to include mission, time, enemy situation, geography and forces in the operation and may or may not be necessary. Critical to the ISB's importance to the logistician is its location is within range of intra-theater movement (airlift, sealift and ground if possible).³⁸ Other key characteristics of an ISB that future logistic doctrine needs to highlight are: secure command and control, secure high throughput facility, efficient transportation node with a mature infrastructure. Additionally, an ISB can hold and house those elements such as Host Nation Support, Contractors, and Logistics Civilian Augmentation Personnel (LOGCAP). By retaining

these mentioned functions in the ISB the logistics footprint in the theater can remain minimized. Army doctrine will contribute to the logistic footprint reduction through the proper use and employment of the ISB in support of the legacy force.

Doctrine will be a powerful tool in the reduction of the logistic footprint. To establish DBL procedures and build the flat force structure required for a successful transformation must all be imbedded in doctrine. The logistics transformation and supporting doctrine "must be clearly and properly focused, and our doctrine...must make the Warfighter' plans possible across the full spectrum of military operations."³⁹ Doctrine is critical to the reduction of the logistic footprint. Doctrine will be the method that allows the legacy force to break away from current mass based supply system.

TECHNOLOGY

Just as doctrine is developed to address the logistics transformation so will technology. Technology will be one of the primary enablers to reduce the logistic footprint. As the force structure is reduced within the logistic footprint technology will enable the smaller sustainment organization to be as effective as its older and larger legacy force. Technology of the objective force will also allow the logistic footprint to be reduced. Currently the 60ton M1A1 Main Battle Tank (MBT) requires over 13 tons of repair parts per 1000 miles driven.⁴⁰ Similarly the M2A2 Bradley Fighting Vehicle (BFV) at a weight of 32 tons per vehicle requires 1 ton of repair parts per 1000 miles driven.⁴¹ The Army's primary fighting platform of the objective force is anticipated to be a 20-ton wheeled vehicle called the Future Combat System (FCS)⁴². Using a projected 2 tons of repair parts per 1000 miles for the FCS the logistics footprint will obtain an 80% decrease in repair parts for the Army's future primary fighting platform.

NEW SYSTEMS

The FCS will also demonstrate a "lower demand for POL than heavy armored forces. The (objective) force can rely more heavily on (DBL system) and 'Just in Time' logistics support."⁴³ Today's armor brigade requires about 130,000 gallons of fuel per day, which is one of the greatest burdens on the logistician.⁴⁴ The objective force brigade, using the FCS as the primary fighting platform, is anticipated to require an average of 75,000 gallons per day.⁴⁵ This technology improvement will reduce the POL requirements by 40% a significant reduction to the

logistics footprint. Another technology development in POL is the potential use of Jet A-1 fuel. Jet A-1 fuel is the commercial fuel widely available throughout the world. Use of Jet A-1 "would eliminate the need to transport bulky additives during initial stages of a contingency. Consequently, the use of Jet A-1 will reduce the logistics footprint considerably."⁴⁶ Finally, as technology is further developed in future fuels possibilities the FCS could be powered through non-hydrocarbon-based fuels. This technology would have a tremendous impact on the logistics footprint. The use of non-hydrocarbon-based fuels "could eliminate completely the need to refuel on the battlefield"⁴⁷ which would be significant in the reduction of the logistic footprint.

Just as fuels technology and the lighter FCS vehicle facilitates the reduction in POL and repair parts within the logistic footprint, the FCS also contributes in another indirect method toward the logistic footprint reduction. The objective force will not require the use of Heavy Equipment Transporters (HET) to move the wheeled FCS about the battlefield, which will result in another reduction in the logistic footprint.

Exploring other technologies that can contribute to the reduction in the logistic footprint are methods of distribution. Simple as it might appear but reducing the requirement for material handling equipment through the use of Palletized Load System (PLS)⁴⁸ also produces positive dividends to the logistic footprint. Additionally, PLS can contribute to footprint reduction by greater use of strategic and combat configured loads in many classes of supply to include ammunition, rations and fluids both fuel and water.

AUTOMATION/INFORMATION TECHNOLOGY

The final and one of the most important areas of technology contributions to logistic footprint reduction is automation /information technology. Additionally, critical to the successful implementation of DBL will be a robust information system. In fact automation/information technology is one of the primary enablers in achieving a reduced logistics footprint. "Replacing logistics mass with logistics velocity will eliminate huge inventory stockpiles. Also, by incorporating modern technology in information systems and adopting best business practices, the Army will reduce the amount of materiel continually present in the theater."⁴⁹ In the mass based or 'Iron Mountain' supply system risk in sustainment to the warfighter was mitigated by having multiple piles or redundancy of supplies of materiel. In the DBL system where those piles of stock no longer exists risk is mitigated by a robust and redundant information system. Additionally, the distribution system or transportation system then becomes at risk in a DBL

system. As the distribution systems are developed risk mitigation by redundant or backup delivery systems should be considered. The Army requires an information system that provides a common logistic operating picture to include asset visibility in process, storage and transit or Total Asset Visibility (TAV).⁵⁰ The system must have redundancy just as the many stockpiles throughout the theater did in the mass based supply system. This information management system must be "real time, web-based, open architecture capability that provides total visibility over logistical assets and related data."⁵¹ We must provide a user friendly simple system that facilitates disciplined supply management where only minimal essential stocks will be deployed forward into the theater. The confidence of the warfighter will be obtained through a Distribution Based Logistic (DBL) system once the information system meets the expectations and effectiveness of both the warfighter and logistician.

To enable the sustainment community to reduce the logistic footprint and perform as a fully effective contributing element to the combat force information technology must be improved dramatically. The smaller logistic support structure of the objective force "requires a network-centric logistics information system integrated, real-time situational awareness; leveraging of technology; and integration of deployment and distribution to create one system that deploys and sustains troops."⁵² As the logistic footprint shrinks automation has got to enable the support force and provide added capability in an austere sustainment environment. Current automation lacks integration and compartmentalizes much of the logistic information and data management systems. Future transformed logistic automation has to eliminate the various stovepipes and layers throughout the supply and maintenance communities. The automation for the logistics transformation is currently typified as

compartmentalized by functions-such as supply, maintenance, and transportation and from wholesale level through several retail layers to the Warfighter. The information systems that support the logistics functions are similarly compartmentalized and cannot generally support an integrated end-to-end logistics process.⁵³

The Army's future IT will be the foundation of the transformed logistic system rather than the items within. The strength, agility and responsiveness of the Distribution Based Logistics system will be IT and its real-time management capability and interchange. In the Army today the logistic IT system is a collection of non-connected systems to include: Standard Army Retail Supply System (SARSS), Maintenance Activity Management System (MAMS), The Army Medical Management System (TAMMS), Transportation Coordinator's Automated Information for Movement System (TC-AIMS) and a number more just to demonstrate the extent of the

“stand-alone applications that do not integrate the logistics functions in an end-to-end fashion.”⁵⁴ Hence, the future IT has got to break-down barriers and transform to a current state of the art capability in a real-time network configuration. Without a dramatic change to the Army’s logistic IT systems, logistics transformation on whole will be a difficult struggle if not impossible.

Technology advantages to reduce the logistics footprint do not end with repair parts reduction, fuel utilization decreases and dramatic IT improvements. In fact fuel ammunition and water are the three greatest drivers in effort within the logistics footprint. A current legacy force brigade combat team (BCT) requires 662.6 short tons (ST) per day of all classes of supply including mail to operate in a combat environment.⁵⁵ A review of the big three supply drivers: fuel; 442 ST per day (67% of the BCT logistic footprint), water 98 ST per day (15% of the BCT logistic footprint) and ammunition 73.1 ST per day (11% of the BCT logistic footprint) requires the bulk of our effort and constitutes 93% of the legacy force supply tonnage per day. Current ammunition estimates for the Interim force is significantly smaller at 5 ST per day or a 95% reduction in ammunition weight in the logistics footprint.⁵⁶ The sole use of ‘smart’ or Guidance Projected Munitions (GPM) facilitates this significant ammunition reduction. In terms of water planning factors can be reduced to about 4 gallons per man per day equaling about 61 ST per day for the BCT or about 40% reduction in water within the logistic footprint. Current new technology in water purification will reduce the logistics required to produce and distribute water by 25%.⁵⁷ This new water technology will also be fielded down to the company level. Hence, through the use of technology the BCT logistic footprint can be reduced by 303 ST or 45% by just focusing on improvements at the big three supply drivers of fuel, water, and ammunition.

Even relatively simple technology such as Strategic Configured Loads (SCL) has the sustainment community excited about the future. These new configurations for movement have the potential to produce tremendous productivity in efficiency of distribution of ammunition and rations. In addition to SCL, dedicated research and development (R&D) could also produce great benefits with a common chassis design. The reductions in repair parts and mechanic skills would be a fantastic facilitator to the reduction in the logistic footprint.

Additionally, research and development enhancements are also looking at the following technologies; Enhanced Coastal Traffic ability, Integration High Performance Aircraft Turbine Engine, Enhanced Airframe, High Energy, Cost Effective Primary and Rechargeable Batteries, and Forward Deployed Robotic Unit (FDRU) as just a few other methods to reduce the logistic footprint in theater.⁵⁸ However, as indicated before technology’s most important enabler in the reduction of the logistic footprint is the development of a real-time worldwide automated logistic management information system. A high performing logistical system is critically dependent on

an ultra reliable communications system. Needs must be communicated. Signals from prognostics and other logistical sensors must be received, processed, acted upon. This requires an integrated logistics information system that supports the core logistical processes. It will be the cornerstone of the RML effort.⁵⁹ The future IT and automation technology is the foundation from which all other logistic Transformation will be possible.

CONCLUSION

The Army's Vision, Logistics Transformation and reducing the logistics footprint are certainly achievable. However, the process is not without its challenges nor risks. The greatest obstacles will not be in the form of technologic leaps but in the cultural change logisticians will have to generate from within and confidence projected to the warfighter. Certainly the critical step in logistics transformation is a force structure change. The firm and committed message of transformation from senior leadership will be clear as logistical force structure is reduced and changed. Included with organizational changes there must be the establishment of a senior logistician at the top of the structure. "The Army should have a single sustainment chain of command from the strategic level to the tactical level."⁶⁰ These organizational changes should be the foundation for logistics transformation.

As indicated in this document at the IBCT level a 60% reduction in CSS personnel and force structure within the logistics footprint can be achieved by streamlining the logistics organization. In terms of total tonnage a 50% reduction can be made in the IBCT logistical footprint by solely focusing on fuel, water and ammunition technologies. Therefore pushing these same results back through the theater logistical footprint some serious reductions can be obtained.

But, the logistical system regardless of its configuration must meet the needs of the warfighter. The logisticians have got to teach the operators as well as themselves that the transformed Army will no longer stockpile supplies within each theater to mitigate operational risk or wait a hundred plus days for 40 to 60 Days of Supply (DOS) until the Army's ground war can start. "The physical distribution and/or transportation of assets through a real-time common operating picture will become 'long pole in the tent' for supporting military operations on a global scale successfully."⁶¹ The reduction in the logistics footprint has got to be the primary goal of the sustainment community and the key enabler will be a viable and confident DBL system.

“ Logistics capabilities might not be as sexy as new tanks, fighters and destroyers, but they are equally essential. Without them, American’s transformed armed force might as well plan to stay at home”.⁶² Logistic transformation and the reduction of the logistic footprint are clearly key elements of the future battlefield. These changes will impact all participants in the theater ground fight. As these Combat Service Support (CSS) changes are directed to the fielded Army the logistic community must also maintain the confidence in the warfighter without the establishment of ‘Iron Mountains’ to mitigate operational risk. Critical in achieving the logistics endstate of transformation is to start the changes with the organization and force structure. The CSS structure needs a single fully encompassing logistical chain of command. This structure requires clout from the top at the strategic level down through the tactical level at the BSB. The new ALSC leadership consolidates CSS efforts and direction at the national level while providing unity of command and unity of effort throughout the sustainment community.⁶³ The ALSC structure change also facilitates the merging of the wholesale and retail sustainment organizations and systems to where there is a truly single seamless logistical system between the national level and the deployed soldier within logistics footprint. Again a 60% reduction in personal and force structure can be achieved with a remodeling of the CSS community built upon a single unified Army Logistics Support Command.

The single greatest systems change in reducing the logistics footprint is the full and complete transition to a Distribution Based Logistical (DBL) system. A DBL system is necessary to eliminate the multiple stockpiles of supplies and capabilities throughout the theater footprint. The transformation from a mass based to a velocity based logistic system will be a significant cultural change for both the warfighter and sustainer. CSS risk will be mitigated not in piles of stuff but in redundant and real time network communications. However, a changed organization and unified leadership will greatly facilitate the strengths of a DBL system. The DBL system is the foundation that allows an ALSC a single tiered supply system extending from the strategic level to the tactical level eliminating stockpiles throughout the world, but most importantly reducing the stocks within the theater logistics footprint.

Technology will be a colossal contributor to the reduction in the logistics footprint. The key technological enabler to achieve both a centralized unified CSS command and a Distribution Based Logistical system is networked worldwide communications. An integrated logistics information system will blend the current functional automation systems into a single networked information system allowing the tactical level to communicate in real time to the CONUS based providers, managers and prioritization process at the ALSC level. Technology advancements in the form of new automation are required to allow the DBL system to function

at its highest efficiency and effectiveness to achieve a 60% reduction in the logistic footprint. Other design improvements will also enhance the footprint reduction as the tonnage of; fuel, water, and munitions are reduced by 50% through technology enablers.

Army Transformation and the vision of the Army's future will impact all aspects of the Army. The objective force will emerge as a mobile, lethal, quick and agile force capable of reaching out to any corner of the globe in a fraction of time compared to the fielded legacy force. To support Army Transformation the logisticians are on a similar pilgrimage with a primary focus to reduce the logistics footprint. Logistic Transformation must mesh with the objective force realizing that "true measure of logistics is combat effectiveness."⁶⁴ The objective force will continue to receive unmatched support in terms of combat readiness, sustainability and an ability to deploy with a logistics footprint at least half its current size.

WORD COUNT = 7,553

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