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Containerization:
An Integral Part of U.S. Force
Projection Capability

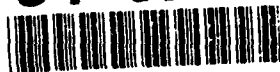Lieutenant Colonel
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CONTAINERIZATION: AN INTEGRAL PART

OF U.S. FORCE PROJECTION CAPABILITY

Executive Research Project S103

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ABSTRACT

This paper argues that the containerization of military cargo
and its intransit visibility are as important as the movement
of the cargo itself. A review of the history of military
containerization and lessons learned from the 1990-91 Gulf
War, reveal that the U.S. armed forces have experienced
systemic problems with containerization for over 25 years. The
paper concludes with recommendations for future corrective
actions including: (1) the development of a single DOD-wide
automated intransit visibility system; (2) the possible
adaptation of commercial tracking systems for military use;
(3) the revision of cargo documentation procedures; (4)
training of logistics personnel and; (5) the acquisition of
container handling equipment.

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CONTAINERIZATION: AN INTEGRAL PART

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"The ability to project our power will

underpin our strategy more than ever."[1]

Introduction

The quote above from the 1993 National Security Strategy of
the United States makes it clear that force projection will
remain a critical military capability for the foreseeable
future. Embedded in our force projection capability is the
ability to move and track containerized cargo to worldwide
strategic locations. If you can get it there but don't know it
or can't find it, then what good is it? Operation Desert
Shield and Desert Storm was the most massive strategic
deployment of U.S. armed forces since Vietnam. But our
experiences during the Gulf War indicate that our military
forces have significant problems in containerization and
intransit visibility. These problems include: (1) the failure
to adequately document container contents at the point of
origin; (2) the lack of a centralized, automated cargo
tracking system that can accumulate data from multiple sources
and; (3) inefficiencies in distribution at the final
destination. If strategic airlift and sealift are the
"archilles heel" of our worldwide force projection capability,
then containerization and intransit visibility are the
archilles heel of the military supply system.

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The thesis of this paper is that the containerization of military cargo and its subsequent intransit visibility is as important as the movement of the cargo itself. This paper will discuss the history and advantages of containerization in the United States and in our armed forces; detail current deficiencies in our military using Desert Storm as a case study; examine on-going corrective action programs within the Department of Defense (DOD); evaluate state of the art, commercial cargo intransit visibility systems and their application to military operations; and provide recommendations to guide future DOD efforts.

Containerization of freight is not a new concept and neither are the problems that we experienced with the containerization and control of military cargo during the Gulf War. A look at the history of commercial and military containerization is instructive.

Containerization is not new

The first use of containers to ship freight can be traced back to 1890. At that time, a type of container called a "van" was in limited use in Germany. By some accounts, the concept of containerization was first introduced in the United States by the Bowling Green Storage and Van Company in 1901. Bowling Green began using steel vans for the transatlantic shipment of household goods.[2] Apparently, this initial use of containerization in the United States was extremely limited –

little else is mentioned of the concept for thirty years. During the 1930s, Pacific Steamship Company began experimenting with containers on the West Coast and in 1931 a rail truck container service was started. The idea slowly began to spread and by the 1950s had established considerable momentum. In 1953, the Alaska Steamship Company successfully experimented with small containers that could be stored in the holds of its ships. The next year Pan Atlantic Steamship Company (which later became Sea-Land Service Inc.) converted a freighter to a standardized container ship. Comparable conversions were made by other U.S. companies throughout the late 1950s. In 1961, U.S. and foreign shippers agreed to the use of standard 20 foot and 40 foot containers with common fittings. This simple international agreement facilitated the exchange of containers among various carriers and was the impetus for the worldwide transformation to container ships. By 1965 there were 20,000 containers in use by U.S. carriers and by 1966 that number had doubled to more than 40,000.[3] As they say, the rest is history.

The U.S. Army - 25 years of containerization

In the 1960s, the U.S. Army began using containers during the Vietnam War. In fact, the Army developed its own containers which were called "conexes". These boxes or containers were constructed with built-in storage compartments or bins. Locator cards which identified stock numbers and quantities of supplies were keypunched and placed inside the containers.

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Upon arrival at depots in Vietnam, the cards were sent to the Inventory Control Point. The conexes were then placed where needed and repair parts or other supplies could be issued directly from them. In 1967, Major General William W. Redling, U.S. Army, wrote a paper in which he recognized containerization as the wave of the future for the rapid deployment and sustainment of military forces. Prophetically, he noted that the key to the effective use of containers was in their control and management. Even in 1967, General Redling's observation was not entirely revolutionary. The automatic identification of containers was already available and in use by several railroads in the United States. In fact, there were several versions by five different manufacturers in existence. One type included a small electronic responder unit that was permanently attached to the underside of the container. An interrogator unit was placed at key locations at depots, interchange points, and storage locations. As the railcars passed the interrogator devices, container identification and contents were electronically transmitted to a control center. This system facilitated the tracking and intransit visibility of the containers from point of origin to final destination.⁴ The existence and use of this commercial, "hi-tech" tracking system in the 1960s undoubtedly led General Redling to foresee its need and application in the Army asset visibility system.

The relatively long history of containerization in the U.S. Army begs a question. If the Army has used containerization for more than 25 years, why is it still experiencing systemic problems that were identified long ago? While there are many contributors to the problem, the main reason has to do with the national military strategy. Following the Vietnam War, U.S. military strategy resorted to one of maintaining relatively small, flexible, rapidly deployable forces to defend national interests around the world. Our military leaders expected that the employment of these forces would be for limited objectives and for operations of relatively short duration. U.S. military deployments to Haiti, Grenada, and Panama were exactly the type of scenarios called for in our national military strategy. However, due to the lack of a major large scale deployment in the 25 years following the Vietnam War and prior to the Gulf War, problems associated with containerization were not surfaced.

If Panama and Grenada were rapid deployments, then the Gulf War is best termed a "massive" deployment. The data below shows the deployment of Army personnel and equipment during the initial six months of three major conflicts. These figures illustrates how massive Desert Storm was in comparison to Korea and Vietnam. As mentioned, these figures are only for Army forces. But since the Army had the largest share of military cargo for these operations, the numbers are fairly representative of the magnitude of the deployment.

ARMY DEPLOYMENTS

	Personnel	Equipment
Korea	45,000	1.6 mil s/tons
Vietnam	168,000	1.4 mil s/tons
Gulf War	303,500	2.3 mil s/ton[5]

Military logisticians have noted that the utility of
containerization is more apparent during large scale
deployments when strategic lift is at a premium. At this
point, a closer examination of the advantages of
containerization is warranted.

Why containerize?

As noted above containerization has been in use commercially
for a hundred years. The merits of containerizing freight can
correctly be assumed in light of this long standing precedent.
However, a review of the advantages of containerization will
substantiate the argument that investing resources to improve
its military effectiveness is a worthwhile cause.

First, containerization saves dollars. Cargo that is shipped
in containers is far less susceptible to damage or theft while
in transit. Containerized freight, in contrast to break bulk
shipments, can be delivered directly to the user thereby
reducing the requirement for intermediate stockage levels and
associated inventory/handling costs.[6]

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Secondly, containerization saves time. Containers can be loaded and unloaded in far less time than comparable tonnages of break bulk cargo. Experience in Operation Desert Shield showed that unloading container ships could be accomplished in 24 to 48 hours while break bulk ships required an average of four days.[7]

Thirdly, containerization makes for more effective use of a shrinking number of oceangoing carriers and ships. A break bulk ship with an average load capacity of 156,000 tons could move 560,000 tons using containers. And because of the reduced vessel turn around time created by faster load and unload times, a ship can make more voyages.[8]

From a military perspective, nothing is more important than speed, reduced costs, and effective use of limited lift assets. Operationally, speed and the effective use of limited shipping could mean the difference in winning and losing the first battle or the whole war. Recall our recent experience in the Gulf War. General Schwarzkopf was, initially, totally preoccupied in rapidly generating adequate combat forces in Saudi Arabia before Saddam Hussein could launch a preemptive attack. In today's political environment of growing economic concerns and drastically reduced defense budgets, cost reductions are of major importance.

Given these inherent advantages of containerization and their application toward military operations, the next step is to assess the effectiveness of the containerization program in the U.S. armed forces. Fortunately, the recently concluded Gulf War is an excellent laboratory on which to base this assessment.

Desert Storm - A case study in chaos!

War is chaos! Our military leaders expect it, train for it, and pride themselves in being expert managers of it. Operation Desert Shield/Desert Storm was the most massive strategic deployment of U.S. Armed Forces since Vietnam. It included the movement of 539,000 soldiers, sailors, marines, and airmen; more than 4 million tons of military equipment and; 7 million gallons of fuel over a distance of more than 8,450 nautical miles. This tremendous logistical feat involved more than 576 aircraft and more than 200 ships.[9] Some amount of logistical chaos was expected!

The Gulf War was truly a logisticians war and our logisticians performed superbly. But the logistical successes of the war were, in large measure, the result of heroic individual and team efforts; innovation and improvisation; and a little luck. Military logisticians had to overcome numerous deficiencies. Especially relevant to this study were the problems associated with the containerization of military cargo and the inability to maintain intransit visibility and control of supplies

destined for Saudi Arabia. Over the full course of the Desert
Storm deployment, we shipped almost 40,000 containers to Saudi
Arabia. If these containers were placed end to end, they would
stretch 188 miles. Of these 40,000 containers approximately
28,000 had to be opened upon arrival and physically inspected
to determine their contents.[10] The halls of the Pentagon
abound with action officer war stories about frantic calls
from Saudi Arabia in search of supplies that were shipped
weeks or months before and could not be located. The inability
to locate or track the original shipments resulted in multiple
shipments of requested supplies and the inefficient use of
strategic lift assets. Deploying units and non-deploying staff
agencies resorted to what a casual observer might call a "war
frenzy". Mistakes were made - standard operating procedures
were not followed. In other cases, systemic problems were
discovered or rediscovered. In the end, our military
logisticians successfully managed the resulting chaos and were
the true heroes of the Gulf War. There were many logistical
lessons learned from the war. Only those that relate to the
use of containerization are discussed in this paper. For
convenience, I have grouped them into three categories:
loading procedures at the point of origin; intransit
visibility and tracking; and inventorying and distribution at
the Port of Debarkation (POD).

Container loading at the point of origin

Containers were loaded or "stuffed" at one of two points:

individual unit locations or depots and other bulk storage points. At unit locations, assigned unit personnel stuffed containers with equipment and supplies that would not fit onto organic unit vehicles. These loading operations were conducted usually without benefit of materials handling equipment; with little or no previous experience in loading containers; and often in a short-notice, chaotic environment. As a result, many containers were loaded with mixed equipment. Weapons and classified material were loaded together without any security documentation. Mixed loads were caused, in part, by the restriction to use standard 20 foot or 40 foot containers and in part by the lack of adequate blocking and bracing materials. Hazardous materials such as petroleum, oils, lubricates and, in some cases, ammunition were placed in containers with other flammable materials and without required hazard warning signs.[11] After loading containers, unit personnel failed to record detailed inventories on shipping documents or to attach inventory documents on the containers themselves. Likewise, they did not record contractor container numbers on unit records to facilitate tracking or retrieval at the POD. Containers often arrived at the ports with only the Unit Identification Code spray painted on the side. In other cases, unit personnel had attached shipping labels generated by the Army's Logistics Marking System (LOGMARS) but they were either lost or damaged enroute to the port. A military observer at one Sea-Land terminal reported that 90 percent of military containers called MILVANS arrived with no container

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numbers. He points out that shipping labels and unit identification numbers are useless to commercial companies.[12]

Problems encountered at military depots were similar. Due to the restriction of using only standard 20 foot and 40 foot containers, depot employees packed many containers with supplies for multiple consignees.[13] Although this technique was employed to maximize shipping assets, it prevented the direct delivery of supplies to the consignee upon arrival in the theater. Most depots correctly used Military Standard Movement Procedures (MILSTAMP) in preparing transportation documentation. However, MILSTAMP procedures did not provide the line item detail required by in-theater personnel.[14]

Intransit visibility and tracking

The Army has no validated cargo tracking system in the form of a centralized automated control center that accumulates data from multiple sources.[15] Instead, the Army relies on the transmission of manifest data from Port of Embarkation (POE) to Port of Debarkation (POD). These manifests are then input into the various Service unique automated logistics management systems. However, the Joint Operation and Planning Execution System (JOPES) is the primary tool used by the joint warfighting commanders and their staffs to manage logistics and deployment information. JOPES has no interfaces with the service logistics management systems. The lack of these interfaces plus different coding systems did not permit the

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systems to exchange vital information.[16] The theater
commander, therefore, was at the mercy of the functional
transportation agencies to provide data on cargo and unit
deployments. Unfortunately, the data provided by these
agencies was often untimely and inaccurate.

All Military Traffic Command (MTMC) terminals use the
Logistics Marking System (LOGMARS) to produce unit equipment
manifests. During the Gulf War, LOGMARS was used for the first
time in a large scale deployment as the primary source of
cargo information. Although final assessments of LOGMARS were
positive, initially there were problems. Soldiers assigned to
Transportation Terminal Units were not trained to operate
LOGMARS computers and software. While these problems were
being worked out, other existing, peacetime cargo
documentation systems were used. However, there are at least
three different automated documentation systems used at MTMC
terminals around the world. This resulted in non-compatible
manifests that made information sharing difficult.[17]
Transmission of manifest data from U.S. and European ports to
Saudi Arabia was also difficult. The Defense Transportation
System lacks state of the art data communications. Normally,
manifest data is transmitted via the military telephone system
called the Digital Dial Network (DDN) or by using commercial
electronic mail service. The size of manifest data files
requires a DDN connection for 20 to 30 minutes. Although DDN
was available in Saudi Arabia, it could not support these

lengthy connections.[18] Representatives of MTMC stated that out of frustration with the communications system, manifest data on floppy disks was frequently hand carried by couriers from POE to POD.

Another problem affecting intransit visibility was the use of multiple ships to complete the voyage to Saudi Arabia. In some cases containers were loaded onto a ship at the POE and, at some point in the voyage, they were transloaded onto feeder vessels for the remainder of the trip to Saudi Arabia. This procedure was used to maximize shipping or to compensate for mechanical failures. MTMC was not always notified of these transshipments which severely hampered intransit visibility.[19]

Inventorying and distribution at the POD

During the first three months of the Desert Shield deployment, the Army had dangerously little logistic force structure in the theater. This was a conscious decision on behalf of military planners in order to rapidly generate a combat presence to deter an expected Iraqi attack into Saudi Arabia. Logisticians had to compete for space on incoming planes with only a very few being successful.[20] The absence of an adequate logistics force structure in the combat theater created mountains of backlogged supplies and equipment at all Saudi Arabian ports. In a 1991 report, the General Accounting Office reported the following in regard to the transportation and distribution problems during Desert Shield:

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> "The military's decision to push enormous amounts
> of equipment and supplies into the theater and
> deploy combat units before support units in the
> first three months of the campaign contributed to
> the problem....Once logistical support units began
> to arrive in the theater and the supply system
> graduated from a push to a sustainment mode, the
> supply units began to get _some_ (emphasis added)
> visibility over the supplies and equipment being
> stored at the ports."[21]

Due to the shortage of logisticians, some units preparing to

deploy to forward operating bases located their equipment and

departed before logistics personnel could record the receipt

of the assets into the theater.

Once support forces began to arrive in the theater, Army

logisticians uncovered another problem. There was no

centralized container management system or single agency

responsible for intra-theater container movements.[22] This is a

deficiency in Army logistics doctrine and existing force

structure. Current doctrine suggests that containerized

supplies be handled as any other supply item through the

existing supply support structure. This doctrine has proven

sufficient in peacetime operations. But, as was discovered in

Saudi Arabia, a massive influx of containerized freight in a

wartime environment presents unique problems. First, there are

two categories of containers: (1) those leased from commercial

shippers, and (2) government owned MILVANS. Leased containers

must be identified, controlled, and ultimately returned to the

owner/contractor. Due to the absence of a centralized

container management system, processing retrograde containers

was a major logistical problem.[23] One year after the end of

the war there were still 5200 leased containers that could not be accounted for.[24] Failure to accomplish this task effectively caused the loss of vast amounts of manhours and detention fines and penalties paid to contract shippers.

Force structure issues were not confined to just personnel problems - there were equipment problems as well. During peacetime operations, the Army depends primarily on commercial assets for drayage. In Saudi Arabian ports, there were insufficient commercial assets to handle the influx of military containers and to accommodate commercial requirements simultaneously.[25] Competition was keen and resulted in delays in moving containerized freight through ports. In addition, there were insufficient military forklifts and other material handling equipment to process containers at the ports or at divisional/corps forward operating bases. Military and commercial forklifts that were available often lacked forks that could be extended to unload twenty or forty foot containers. As one Desert Storm logistician noted, most support soldiers claim to be forklift operators. But when they were called upon to handle containerized freight, their skills and training were often found to be woefully lacking.

A proliferation of developmental systems

Most of the problems with containerization management and transportation identified in this research project have been captured in Desert Shield/Desert Storm lessons learned.

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Various agencies within DOD are already at work developing and testing possible solutions. The U.S. Transportation Command (USTRANSCOM) is currently coordinating and implementing a Containerization Master Action Plan to solve many identified problems. The master plan includes: doctrine and policy; research, coordination, and management; and mobility systems issues.[26] In addition, the commercial shipping industry has experienced similar container management problems. In some cases they have already developed and implemented automated, state of the art, intransit visibility systems. This section summarizes on-going DOD development programs and contrasts them with one existing commercial system.

On-going DOD actions

TRANSCOM is currently developing a system called the Global Transportation Network or GTN. GTN is advertised as an integrated transportation database with a set of application programs. When completely developed, it will fully automate command and control, planning, and intransit visibility functions. The GTN computer will match aircraft mission and ship voyage numbers with cargo, passenger, unit, and patient data. It will also integrate supply requisition information with cargo movement data. Information will be transmitted from remote terminals located at installation transportation management offices as well as commercial carriers/shippers. The system design also calls for interfaces with the Joint Operation Planning and Execution System (JOPES) and other

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existing DOD/service logistics management systems.[27] TRANSCOM began limited testing of the system in February 1993. Preliminary results indicate some interface problems with JOPES and other automated systems.[28]

The U.S. Department of Transportation's Volpe National Transportation System Center has initiated a project to explore the feasibility and benefits of augmenting existing DOD information systems with state of the art Automated Identification Technology (AIT). AIT uses electronic identification tags attached to containers and tag readers or interrogators to provide container content identification and visibility of containerized U.S. Army cargo being deployed and distributed world-wide. This demonstration program is called the Future - Europe Automated Identification Technology (Future-EUR AIT) initiative. Phase I of the demonstration will use the on-going retrograde of ammunition and other equipment from U.S. Army Europe to the continental United States to demonstrate the practicality of using electronic identification tags under real world conditions.[29] At the containerization points, identification tags are encoded with standard transportation control and movement data that identifies container contents. These tags are attached to containers and read by interrogators at various nodes or choke points along the route from point of origin to final destination. Interrogators will be either fixed or hand held with the option of reading only the container number or the

entire tag. Information from the interrogators is transmitted by a commercial satellite network to a data fusion center and displayed on screens in monitor stations. System components for this initiative are primarily commercial, off-the-shelf technology.[30]

The U.S. Army Quartermaster Center envisions that future strategic supply and service operations will focus on support to the theater of operations from continental U.S. economic and industrial bases. This concept will entail using echeloned and "split operations" Essentially, the bulk of Material Management Center personnel and computers will remain in the States during strategic deployments. A bare bones element will be displaced to the theater of operations and, using a remote terminal, it will record the receipt or storage of containerized materiel. These receipts along with requisitions for other supply requirements will be transmitted to the Materiel Management Center in the States via assured or dedicated satellite communication networks.[31] This system, referred to simply as split operations, will be tested in the future at Fort Bragg, North Carolina.[32]

COSMOS - the future is here today

Over the years, commercial shipping companies have experienced intransit visibility problems in their daily business operations. Today there are a number of commercially developed automated tracking systems in use. An example of one of these

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systems is the Customer Operations and Service Master On-line System (COSMOS) used by the Federal Express Company. In the Federal Express system, an air bill is attached to each package at the time of consignment. The air bill contains a ten digit, bar coded tracking and tracing number. The ten digit numbering system allows for over a billion documents to be tracked simultaneously. A sophisticated automation system provides customers with an exact status within 30 minutes of real time. The package is tracked at each handling point by using a hand held bar code scanner with more memory than an IBM personal computer. Information is transmitted to the COSMOS mainframe computer by radio signal or by a standard telephone line through a mobile, van mounted computer or a portable hand held model. Packages in containers are consolidated under a single tracking number. This allows packages to be tracked without opening containerized bulk shipments. Federal Express describes this system as the largest and most sophisticated computer network in the world.[33] Although COSMOS may not be precisely suited for military operations, it illustrates the type of technology that is available today.

Assessments and conclusions

Containerization is an integral part of the total U.S. force projection capability. The effective military use of containerization rests primarily on the ability to maintain intransit visibility and control of containers and their

contents. If we are unable to clear our ports efficiently and to effectively use existing lift assets, how can we hope to justify the acquisition of more ships and cargo planes? The debate over the right numbers of ships and planes is likely to continue unabated. However, military logisticians cannot allow the problems associated with containerization and intransit visibility to be overlooked by our military leaders and congressional representatives. Ships and planes are important, but their value is greatly diminished if we are unable to control the cargo that they carry.

Lessons learned from the Gulf War clearly indicate that our military containerization program was so ineffective that the inherent advantages of speed and reduced cost were negated. Many of the problems associated with the control of containerized cargo during the Gulf War were identified more than 25 years ago. The Department of Defense still has not resolved them! We must find and implement effective solutions to these problems now so that we will not have to relearn them during the next war. To that end, I offer the following recommendations:

(1) Military logisticians must clearly articulate to the warfighters the requirements for a validated, intransit visibility system and the risks involved with not having one. The system ultimately adopted must be automated and integrated through a centralized data base with existing Service

logistical management systems and the Joint Operation and Planning Execution System. The system must be capable of operating in an austere, wartime theater as well as in a peacetime environment. It will require access to assured or dedicated satellite communications as opposed to merely sharing an existing satellite link. Our warfighters must "buy in" to these requirements or they will not provide the funding or support required to obtain a state of the art system. USTRANSCOM should have the lead in this effort as the coordinator of DOD's Containerization Master Action Plan.

(2) The military should work closely with civilian shipping companies to resolve intransit visibility and cargo control problems. Because of our present and future reliance on commercial shipping, the problem is no longer just a military one. A military intransit visibility system must be connected with commercial container management systems as well as Service unique systems. In fact, most of the major U.S. shipping companies such as Federal Express, Sea-Land Inc., and American President Lines already have automated cargo tracking systems. The adoption or modification of one of these existing systems to solve military requirements would save both time and money.

-(3) TRANSCOM must be empowered to supersede Service parochialism and to force the implementation of a standardized DOD-wide system. Programs in development now such as the

Global Transportation Network and the Future-Europe Automated Identification Technology initiative clearly have great potential. But we can hardly afford the time and money required to independently develop multiple systems that are neither integrated nor connected. TRANSCOM must have the authority to coordinate the development of these systems. Granting centralized budget authority to the Joint Staff would help to force joint solutions to common Service problems. Currently, the control of DOD automation funds is centralized in the Defense Information Systems Agency (DISA). An interim solution would be to funnel all funds for the development of automated intransit visibility systems through TRANSCOM.

(4) The Military Traffic Management Command (MTMC) should adopt a standardized manifest system that is used in both wartime and peacetime operations. There are a number of automated manifest systems in peacetime use at MTMC terminals around the world. But during the Gulf War they all converted or attempted to convert to LOGMARS. The procedures developed during Desert Storm to produce and transmit LOGMARS databases must be standardized and incorporated into peacetime operations.

(5) The Services and the Joint Staff must review and revise, where applicable, doctrine and procedures pertaining to container management and control. Military Standard Transportation and Movement Procedures (MILSTAMP) must provide

detailed item information required by theater planners and operators. Numbering systems for military owned containers must be compatible with commercial numbering systems to avoid delays in shipment. Logistics operators must ensure that each logistics support plan provides for a centralized container management system with a single in-theater manager.

(6) The Services must train soldiers/DOD civilian employees and enforce discipline in the containerization of unit equipment and wholesale supplies. Units with strategic wartime missions must develop training plans that include container loading and marking; transportation documentation procedures; and container handling procedures. Basic loads must include provisions for blocking and bracing materials, and hazard warning signs.

(7) Finally, the armed services must develop requirements and seek funding for drayage and material handling equipment suitable for container operations. The material handling equipment must have fork extensions capable of loading or unloading standardized containers and be authorized in divisional/corps support units as well as wholesale support activities and transportation service companies. This equipment will provide the capability to direct deliver containers to their final destination.

[1]Bush, George, <u>National Security Strategy of the United States</u>, Washington, D.C., U.S. Government Printing Office, 1993, pages 28-29.

[2]Redling, William W., Major General, U.S. Army, "Control - the Key to Containerization", Fort Bragg, North Carolina, 1967, page 3.

[3]Bauer, K. Jack, <u>A Maritme History of the United States: The Role of America's Seas and Waterways</u>, University of South Carolina Press, Columbia, South Carolina, 1988, page 317.

[4]Redling, page 4.

[5]Association of the United States Army Special Report, "Operations Desert Shield and Desert Storm: The Logistics Perspective", September 1991, page 4.

[6]Bauer, page 316-317.

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