Agile Transportation for the 21st Century Objectives for the Defense Transportation System

GRADUATE RESEARCH PROJECT

Brad J. Eungard, Capt., USAF
AFIT/GMO/ENS/02E-04

DEPARTMENT OF THE AIR FORCE

AIR UNIVERSITY

AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.

AFIT/GMO/ENS/02E-04

AGILE TRANSPORTATION FOR THE 21ST CENTURY (AT2000) OBJECTIVES FOR THE DEFENSE TRANSPORTATION SYSTEM

GRADUATE RESEARCH PROJECT

Presented to the Faculty of the Graduate School of

Engineering and Management of the

Air Force Institute of Technology

Air University

Air Education and Training Command

In Partial Fulfillment of the

Requirements for the Degree of

Masters of Air Mobility

Brad J. Eungard, B.S.

Captain, USA

June 2002

Approved for public release, distribution unlimited

Disclaimer

The views expressed in this academic research paper are those of the author(s) and may not reflect the official policy or position of the US government or the Department of Defense.

Contents

Illustrations

Page

Tables

Page

Acknowledgments

I wish to thank the following for their time, support, and exceptional efforts in the research and review of this project: Dr. William Cunningham, AFIT, and Mr. Keith Seaman and Mr. Bob Frost, USTRANSCOM J5-SC Concepts and Technology Team. Additionally, I would like to thank my wife for her unending support and encouragement. Finally, I thank God for giving me the wisdom and endurance to complete this research.

Captain Brad J. Eungard

Abstract

The Department of Defense (DoD) recognizes the benefits of in-transit visibility of commodities throughout the Defense Transportation System (DTS). The United States Transportation Command (USTRANSCOM) created the Global Transportation Network (GTN) as the primary command and control (C2) tool to capture and utilize in-transit cargo data. Currently, the USTRANSCOM J5 is developing an advanced concept in technology demonstration (ACTD) called Agile Transportation for the 21st Century (AT2000) to improve C2 of cargo in-transit anywhere in the DTS.

While developing AT2000, USTRANSCOM continues to focus on supply-chain management as part of a revolution in military logistics (RML). The United States Army's Velocity Management and USTRANSCOM's Strategic Distribution Management Initiative (SDMI) are key supply-chain initiatives in RML. Will the objectives of AT2000 improve or hinder these supply-chain initiatives? This question will provide the impetus for this research paper.

Chapter 1

Overview

Introduction

> *Focused logistics will effectively link all logistics functions and units through advanced information systems that integrate real-time total asset visibility with a common relevant operational picture. These systems will incorporate enhanced decision support tools that will improve analysis, planning, and anticipation of warfighter requirements.*
>
> *- Joint Vision 2020*

The Joint Chiefs of Staff provided the clear guidance above to guide all Department of Defense (DoD) logisticians in making "revolutionary improvements" in their core competencies. (JCS 2000) These improvements are to follow the Focused Logistics Transformation Path also specified in the Joint Vision 2020:

- FY01, implement systems to assess customer confidence from end to end of the logistics chain using customer wait time metric.
- FY02, implement time-definite delivery capabilities using a simplified priority system driven by the customer's required delivery date (RDD).
- FY04, implement fixed and deployable automated identification technologies and information systems that provide accurate, actionable total asset visibility.
- FY04 for early deploying forces and FY06 for the remaining forces, implement a web-based, shared data environment to ensure the joint warfighters' ability to make timely and confident logistics decisions.

What is the basis for this Transformation Path? What are the current initiatives that are meeting the JCS's logistics goals? And finally, what future initiatives and programs are being developed to enable logisticians to meet this timeline? These questions will form the basis for this research project beginning with a brief history on the evolution of in-transit visibility (ITV), as ITV enabled the DoD to develop decision support tools to improve command and control over the distribution and storage of supplies. One such decision support tool currently in development is the advanced concept in technology demonstration (ACTD) called Agile Transportation for the 21st Century (AT2000). ITV has also enabled the success of supply-chain management initiatives Velocity Management (VM) and Strategic Distribution Management Initiative (SDMI).

Background

During an Advanced Studies in Air Mobility (ASAM) class trip to the United States Transportation Command (USTRANSCOM), the class attended briefings on the Strategic Distribution Management Initiative (SDMI) and Agile Transportation for the 21st Century (AT2000). Following the briefings, I encountered Mr. Bob Frost, a MITRE contractor working at USTRANSCOM with the AT2000 program, who requested research on the link between the current DoD supply-chain initiatives and AT2000. Mr. Keith Seaman, GS-15, USTRANSCOM J5-SC Concepts and Technology Team, is the AT2000 program director and is the sponsor for this research.

Description of ITV

ITV refers specifically to the ability to track the identity, status, and location of DoD unit and non-unit cargo, passengers, and medical patients from origin to the foxhole during peace, contingencies, and war. (JCS 1994) The commercial sector's advances in ITV and total asset visibility (TAV) have added tremendous value to the military's supply-chain and have enabled the military to provide more flexible logistics services.

Description of AT2000

Agile Transportation for the 21st Century (AT2000) is an advanced concept in technology demonstration (ACTD) for the Defense Transportation System (DTS) that will allow USTRANSCOM to prepare proactively for a wide range of future military strategic, crisis, and humanitarian mobility challenges. In concert with Joint Vision 2020, AT2000 will focus on identifying, exploring, and fostering advanced synergistic technologies with an "end-to-end" systems perspective of the transportation/logistics processes. (Seaman 2001) This ACTD follows the guidelines of the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) for all DoD ACTDs with a common goal of providing a prototype capability to the warfighter and to support him in the evaluation of that capability. (E. C. Aldridge 2001)

Description of Current Supply Chain Initiatives

Since 1995, the Army's Velocity Management (VM) initiative has brought a new way of doing business to U.S. Army logistics. As the term "Velocity Management" implies, this initiative focuses on improving the speed and accuracy with which materials and information flow from providers to users. VM views the logistics system as a set of interlinked processes –*a supply chain*- that delivers products and services (such as spare parts and equipment maintenance) to customers. (Dumond 2001) Following the success of the Army's VM initiative, USTRANSCOM and the Defense Logistics Agency (DLA) are in the process of redesigning and streamlining the Department of Defense global distribution system through the Strategic Distribution Management Initiative (SDMI). (Service 2001)

Methodology

Because advancements in transportation and information technologies have triggered the revolution in military logistics (RML), the likely starting point for this research is to introduce in-transit visibility (ITV) and chronicle its evolution to the present. Following the introduction to ITV, this paper will introduce the three primary topics of interest: AT2000, the Army's supply-chain initiative Velocity Management (VM), and USTRANSCOM's Strategic Distribution Management Initiative (SDMI). After each topic is introduced, I will conduct an analysis of the specific objectives of AT2000 versus their impact on the SDMI and VM initiatives. Following the analysis of AT2000 objectives, I will conclude this research project with recommendations for further study.

Chapter 2

IN-TRANSIT VISIBILITY AND TOTAL ASSET VISIBILITY

Introduction

> *Total Asset Visibility and availability is absolutely essential to precision-focused distribution logistics…. When the automated infrastructure components of distribution-based logistics become a reality, TAV data also can support decisions by materiel and transportation managers to redirect shipments and transportation assets, to redistribute unclaimed assets, and to keep up with changing unit locations and requirements.*
>
> *- Army Strategic Logistics Plan*

Military logisticians have tried consistently to improve the distribution pipeline that was anything but "seamless" prior to, and at times during, the Gulf War. Manual requisitioning systems, stove-piped node managers, and "blind" inventory managers were typical in this now antiquated supply-chain. Since the commercial sector's development of electronic data interchange (EDI), in-transit visibility (ITV), and total asset visibility (TAV), the military has begun a revolution in supply chain management. It is important to make the following distinction between TAV and ITV: TAV represents the superset of materials being moved throughout the DTS and materials in storage, whereas ITV is the subset of TAV that provides information solely on materials that are moving in the system. (USDOT 1994)

Following the Gulf War, U.S. forces were faced with over 40,000 containers of deployment and sustainment equipment that had to be opened, inventoried, resealed, and reinserted into the supply-chain because their contents were not known. Military logisticians quickly focused on improving asset visibility and tracking so as to not repeat this blunder in future operations. (Wolford 1996) The following literature review highlights historical guidance from all command levels on the military's use of ITV/TAV and the advancements that have resulted from this guidance. These achievements enabled the topics of interest in the paper and are a necessary starting point.

Historical Guidance on ITV/TAV

The United States Transportation Command (USTRANSCOM) recognized the tremendous value-added to shipments moved by commercial carriers utilizing EDI technology. USTRANSCOM Regulation 4-5, published in 1991, mandated that "data in USTRANSCOM transportation systems containing transportation and logistics data and those that interface with commercial systems will interface with Electronic Data Interchange (EDI) standards." (USTRANSCOM 1991) Further, USTRANSCOM tasked its own J3/J4 to administer data and database administration to ensure that the Transportation Component Commands' logical data models were consistent with the logical data model that was developed by USTRANSCOM. In 1994 The Deputy Under Secretary of Defense for Logistics directed that the USTRANSCOM take the lead in developing the defense ITV/TAV capability based on their success with their Global Transportation Network (GTN). (USTRANSCOM 2000)

On January 15th, 1998, the Assistant Deputy Under Secretary of Defense Acquisition, Technology, and Logistics, issued a Transportation Acquisition Policy which directed DoD to meet its transportation requirements, to the maximum extent possible, through the use of commercial transportation resources (JCS 1995). This policy requires commercial carriers to use electronic commerce/electronic data interchange (EC/EDI) to provide ITV data on DoD shipments while they are moving. By 1999, the United States Transportation Command (USTRANSCOM) was capturing data from top carriers through their Global Transportation Network (GTN).

USTRANSCOM created GTN to collect data from source systems in an integrated database and to provide ITV, C2, and business operations' applications and information. GTN provides the capability to monitor all movement such that, when combined with planning and analysis tools; transportation performance measurement; and decision support systems, forms a capability essential to planning, directing, and controlling DTS operations. (USTRANSCOM 2000) GTN supported C2 operational capabilities by providing to its 6,000 registered users visibility, status, and location of cargo, personnel, and units moving within the DTS through over an average of 2,500 GTN daily queries. (Heath 2002)

While USTRANSCOM was achieving great success with the ITV portion of TAV, military leaders wanted more effort concentrating on obtaining visibility of all "in storage" materials. The Army's Vice Chief of Staff, GEN Keane, projected that the Army will achieve accurate TAV and accessibility through the use of automatic identification technologies (AIT)/automated information systems (AIS) and transformed business practices by FY 04. GEN Keane commented that

> TAV will enable the Army to get the right item to the right place at the right time, to redistribute assets to meet needs, to divert in-transit assets when required, and to avoid buying and repairing items unnecessarily. TAV allows managers to conserve scarce resources, provide stewardship

> of Army assets and improve C2 decision-making. Current capability includes visibility of more than three million NSNs for managers throughout the Army and DoD. (Keane 2000)

The problem here is that the Army is looking at the Global Combat Support System (GCSS) for TAV and ITV, thereby introducing a new C2 system instead of expanding or drawing ITV data from GTN. GCSS is being created with the end state of a secure web-based system allowing DoD users to access shared data and applications, regardless of location, supported by a robust information infrastructure. This will result in 1) near real-time command and control of the logistics pipeline, 2) one fused picture of combat support to the warfighter, and 3) a closed link between command and control and combat support during critical execution of an operation. (USTRANSCOM 2000)

The Secretary of Defense's Quadrennial Defense Review included similar guidance for the future Standing Joint Task Force (SJTF) concept:

> SJTF headquarters will have a standardized joint Command, Control, Communication, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR) architecture that provides a common relevant operational picture of the battlespace for joint and combined forces. And it will have mechanisms for a **responsive integrated logistics system** that provide warfighters easy access to necessary support without burdensome lift and infrastructure requirements. (DoD 2001)

The ITV/TAV direction from DoD and the Services then is a single system that provides total asset visibility to the warfighter and the logistician in order to improve command and control and increase flexibility. This directive is consistent with the Joint Vision 2020's Focused Logistics that seeks to link all logistics functions and units through advanced information systems that integrate real-time TAV with a common relevant operational picture. The TAV piece can be said to be the "glue" that will bind the supply-chain together and make "seamless logistics" attainable. (Harvey 2001)

Following the clear guidance from the leadership, emerging technologies in the TAV area will now be addressed.

ITV/TAV Technologies

The USTRANSCOM's Defense In-Transit Visibility Integration Plan and the Defense Logistics Agency AIT Implementation Plan contain the current and emerging media that enables military logisticians to achieve total asset visibility. The technologies are grouped into the following areas: bar codes/optical memory cards (OMCs), radio frequency (RF) identification, and satellite-tracking. I will address three areas in greater detail in the following pages in order to present to the reader the technologies that are improving the TAV of material.

Bar Codes

Bar codes are symbols that represent stock-keeping units (SKUs), National Stock Numbers (NSNs), Transportation Control Numbers (TCNs), and serial numbers. Stock-keepers/node operators scan the symbol with hand-held readers to decode the symbol and transfer the data to automated information systems (AIS). By scanning the symbol, stock-keepers collect data about items moving in the logistics chain. There are two general types of bar codes: linear and two-dimensional (2D).

Linear bar codes are one-dimensional bar codes; in other words, the information is carried in only one direction—left-to-right—and represents a limited group of characters. DLA primarily uses two types of linear bar codes—Automatic Identification Manufacturers' BC-1 Code 3 of 9 (Code 39) and Interleaved 2 of 5 (I 2 of 5), but DoD also recognizes the use of the newer Code 128.

Code 39

Interleaved 2 of 5

Code 128

Figure 1 - Linear Bar Codes (DLA 2001; Bellhawk 2002)

DLA uses Code 39 bar codes extensively to support its business processes, as well as those of its customers. Code 39 bar code use is not uniform because it is driven by the unique requirements of each depot. Federal Express (FedEx) is a principal user of I 2 of 5 bar codes. (DLA 2001) DLA prints these bar codes on labels for FedEx shipments. In October 2000, DoD identified the third coding type, Code 128, as one of two "permanently acceptable bar codes when identified in an international or national standard."   Code 128 is a double-density code; that is, it encodes two numeric digits as a single character. Therefore, it allows for encoding of more data in the same space. Although a Code 128 bar code is similar in size to a comparable I 2 of 5 bar code, it has a significantly larger character set—which provides more flexibility.

Two-Dimensional (2D) bar codes get their name from the fact that they store data in two directions: left-to-right and top-to-bottom. They can store significantly more data than linear bar codes, facilitating more complex applications and can sustain considerable damage and still be read. The 2D bar codes fall into three categories: portable data file (PDF) 417, MaxiCode, and Data Matrix.

Figure 2 – 2D Bar Code (Bellhawk 2002)

Every PDF 417 bar code is composed of a stack of bar-coded rows, from a minimum of 3 rows to a maximum of 90 rows. Each bar code can encode up to 1,850 characters. (DLA 2001) DoD initially used PDF 417 bar codes on military shipping labels (MSLs) during 1998–1999. DLA distribution sites now print them on all MSLs. A second type of 2D code, MaxiCode is a medium-capacity matrix bar code that is designed for the high-speed scanning application of package sorting and tracking introduced in 1992 by the United Parcel Service (UPS), who still uses it. The American National Standards Institute (ANSI) recommends MaxiCode in ANSI MH10.8.3M as the most appropriate 2D symbol for sorting and tracking. Although DoD accepts MaxiCode as the standard for logistics sorting applications, there are currently no DoD applications utilizing this code. Lastly, the Data Matrix is a high-capacity matrix bar code that is popular for marking small items such as integrated circuits, printed circuit boards, and parts. DoD recognizes the data matrix code as an acceptable marking, but there are also no DLA applications for Data Matrix bar code technology.

Optical Memory and Common Access Cards

The companion to bar codes, optical memory cards (OMC) use technology popularized by audio compact disks (CDs) and audio-visual CD-ROM (read only memory) products. OMC technology works on the principle of reflectivity. OMC uses “write once, read many times” technology; its application differs from bar-code technologies in that data may be written to the card in sequential order, on many occasions, until all available memory has been used. (DLA 2001) OMCs contain large amounts of data and are relatively inexpensive, reusable, rugged, relatively stable, and unaffected by climatic variations. DoD accepts as standard the Drexler European License Association (DELA) format for OMCs, and has been generating OMCs to support customer requirements since 1992 as part of the Automated Manifest System (AMS).

Figure 3 – Optical Memory Card (DLA 2001)

Common Access Cards or smart cards are similar to OMCs but are intended for DoD personnel to replace their identification cards. In November 1999, the DUSD released a memorandum directing the adoption of smart cards. (USTRANSCOM 2000) Smart cards improve data accuracy and timeliness when manifesting passengers for movement and when origin installations and aerial ports electronically transmit standard manifest data using appropriate AIS to provide data to GTN.

Figure 4 - Common Access Card (Lowe 2001)

Radio Frequency Identification

Radio Frequency Identification (RFID) provides operators with a means to remotely identify, categorize, and locate materiel automatically while in transit. Data is stored digitally on RFID transponder devices, such as RF tags or labels. Remote interrogators (located a few inches to more than 300 feet from the transponder device) electronically retrieve the data via electromagnetic energy (radio or microwave frequency) and send the data to AISs. (DLA 2001) Active systems are omni-directional and require moderately expensive, high-capacity (126 kilobytes) transponder devices.

Active technology, continuously able to receive/read RF tags, has three characteristics that are significant for military operations. First, RFID tags are effective portable databases. Second, the tags facilitate rapid transfer of data to AISs. Third, active technology offers the only standoff, omni-directional capability to collect data at distances of 300 feet. (DLA 2001) DoD first used active RFID technology in 1993 to provide in-transit visibility (ITV) during ocean retrograde of munitions and equipment from Europe. Since that time, RFID has supported exercises, contingency operations, and movement of selected sustainment seavans and air pallets. DoD adopted the 1993 Joint Total Asset Visibility (JTAV) RFID tag format as an interim standard.

Satellite-Tracking

Commercial satellite-tracking systems provide the ability to track near-real-time location of vehicles, materiel, and convoys and offer a digital communication capability to drivers. A system to track trailers or containers typically requires five components—a transceiver unit, a satellite, an earth station, a vendor network control center (NCC), and a

DoD logistics AIS. (DLA 2001) The military organization and AIS receiving the data are the focal points of satellite tracking; they are called a satellite-tracking operations center (See figure 4 below). A transceiver unit is installed on a vehicle or container that is being monitored. This unit exchanges information with an earth station via satellite communications.

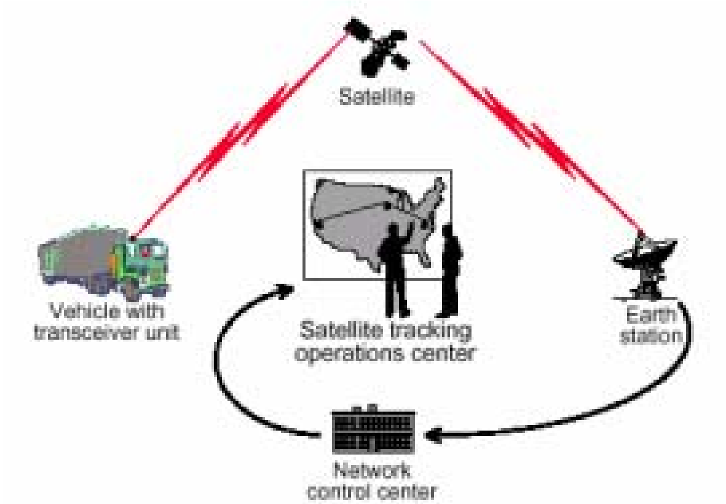


Figure 4 – Satellite Tracking Components (DLA 2001)

DoD uses two satellite-tracking systems to support logistics operations: Defense Transportation Tracking System (DTTS) and The Defense Transportation Reporting and Control System (DTRACS). DTTS, operated by the Navy for DoD, uses commercial satellite-tracking technology to monitor more than 47,000 arms, ammunition, and explosive shipments by commercial motor carriers each year in the continental United States (CONUS). (DLA 2001) DoD requires that these shipments, as well as an increasing number of other sensitive materiel shipments, be monitored from origin to destination because of public safety concerns, high value, and sensitivity.

The Defense Transportation Reporting and Control System (DTRACS), which is a DTTS derivative tested initially in Bosnia during Operation Joint Endeavor, has several applications. Its largest logistics application supports the 37th Transportation Command's monitoring of military truck movements, convoy operations, and trains in central Europe, including support of contingency operations in the Balkans.

Conclusion

There is clear guidance in the DoD to harness current commercial AIT/AIS technology and provide TAV to the warfighter. DLA is leading the effort with continued improvements in TAV through the advancements in AIS/AIT that include two-dimensional bar codes, RFID and satellite tracking. Without a clear operational picture of the logistical assets moving into and currently in theater, logistical plans are destined to result in gross miscalculations and redundancies slowing down the warfighter instead of enabling them. TAV is the foundation for the following topics in this research: Agile Transportation, Velocity Management, and the Strategic Distribution Management Initiative.

Chapter 3

AGILE TRANSPORTATION FOR THE 21ST CENTURY (AT2000)

Introduction

"Agility in our logistics structure makes force agility."

- GEN Shiseki, Army Log Summit 2000

The USTRANSCOM J5-SC Concepts and Technology Team has proposed an Advanced Concept in Technology Demonstration (ACTD) called Agile Transportation for the 21st Century (AT2000). The J5-SC created this ACTD in response to current national, DoD, and Joint guidance. A discussion of ACTDs, the current guidance that provided the impetus for AT2000, and the purpose, objectives, and status of AT2000 follows.

Advanced Concepts in Technology Demonstration (ACTD)

In early 1994, the DoD initiated a new program designed to help expedite the transition of maturing technologies from the developers to the users. The Advanced Concept Technology Demonstration program was to help the DoD acquisition process adapt to today's economic and threat environments. ACTDs emphasize technology assessment and integration rather than technology development. The goal is to provide a prototype capability to the warfighter and to support him in the evaluation of that capability.

There are several key criteria by which ACTD candidates are evaluated by the Deputy Under Secretary of Defense for Advanced Systems and Concepts (DUSD(AS&C)): response to user needs, maturity of technologies, and potential effectiveness. ACTDs focus on addressing critical military needs. ACTDs are based on mature or nearly mature technologies to avoid the time and risks associated with technology development, concentrating instead on integration and demonstration activities. The potential or projected effectiveness must be sufficient to warrant consideration of an ACTD or the capability must address a need for which there is no suitable solution. There is an AT2000 representative on an oversight group that provides a decision making body that can respond quickly to significant program issues requiring management direction or approval. (DUSD(AS&C) 2001)

Current National, DoD, and Joint Guidance

There is no shortage of guidance to military logisticians on the current status and future vision of the military supply chain. This guidance, to improve C2 and logistical flexibility through technology advancements, is consistent from the White House down to the Chairman, Joint Chiefs of Staff, and Service level and is summarized below (bold text specifically highlights the guidance targeted by AT2000):

- "Transformation of our military forces is critical to meeting the military challenges of the next century. Transformation extends well beyond the acquisition of new military systems – we seek to **leverage technological**, doctrinal, operational, and organizational **innovations** to give the U.S. forces greater capabilities and **flexibility**." (House 1999)
- "We need to continue to move towards a "seamless" force deployment and support structure that efficiently and effectively moves forces from the CONUS "fort" to the "foxhole" in theater." (DSB/USD(A&T) 1996)

- "Modernize the DoD-wide approach to business information. Today's **technology** makes the **accurate, timely flow of information** possible. Pushing this information down will **enable decision-making** at the right level and will, in turn, support the flattening and streamlining of the organization." (DoD 2001)
- "Focused logistics will result from revolutionary improvements in information systems, innovation in organizational structures, reengineered processes, and advances in **transportation technologies**. Focused logistics will effectively link all logistics functions and units through advanced information systems that integrate real-time total asset visibility with a **common relevant operational picture."** (JCS 2000)
- "Technological advances will lead to increased worker productivity, lighter equipment, and **faster transportation**. The explosion of network technology, Web-based capabilities and wireless communications provides tremendous opportunities for **global access to data within the DTS**. One challenge ahead will be to integrate this wealth of data into **decision-quality information and make that information available any time, any place**. …. **End-to-end solutions** must be pursued wherever feasible and appropriate." (USTRANSCOM 2001)
- "Furthermore, **real-time control** needs to be coupled with TAV and the RML distribution platforms and infrastructure components, and all must be put under the control of the Seamless Logistics System…. Interoperable C2 will help create a seamless operational concept and a **single battle rhythm**. Not only will **logistics support be enhanced**, but there will also be a corresponding and substantial reduction of the logistics footprint in the theater of operation." (DCSLOG 2000)
- "The ultimate goal for the Army of the 21st century is an appropriately configured – and **highly responsive –** logistics team, which sustains operational tempo without operational pause, and has the CINC's complete confidence." (Keane 2000)

At all levels of command, the guidance focused on improving logistics by obtaining better technology, promoting better control of the supply chain, and fostering synergism at all nodes in the DTS by keeping an "end-to-end" systems perspective. USTRANSCOM, in keeping with ACTD guidelines and directives from higher command levels as well as Service requests, created AT2000 to begin bridging the gap of current and future logistics.

AT2000 Objectives and Focus

To meet the military's increased dependence on power projection, the Defense Transportation System (DTS) must be enhanced to offset the decreased global presence of U.S. forces. The DTS in the 21st Century will be grounded on the principle of centralized command and control and decentralized execution. The management of the DTS will therefore require vast amounts of data available in real-time even though assets may be dispersed around the world. Because of these requirements and preceding guidance, AT2000 proponents have set three goals/objectives for their emerging system: (Seaman 2001)

1. Insert key database and scheduling technologies into the DTS to improve its management process
2. Provide the Commanders in Chief (CINCs) and individual Services more responsive and efficient intermodal and multimodal service
3. Establish the framework to ensure continuous DTS improvements

USTRANSCOM has identified two key deficiencies in the DTS while addressing their objectives. These deficiencies are:

1. There is a lack of a movement requirements database and management capability that can provide a user with total visibility of all requirements and available assets while predicting potential bottlenecks in the DTS and improving the intermodal analysis and mode determination decision process.
2. Command and control systems reflect an in-transit visibility focus instead of an integrated approach that collects, portrays and assesses, on a real time basis, total DTS movement requirements coupled with the capability to accomplish mode determination. (Seaman 2001)

Based on these deficiencies, AT2000 will focus on inserting key technologies aimed at enabling USTRANSCOM and its components to manage efficiently the DTS through mode determination and optimization. These technologies will allow USTRANSCOM to select the best modes for each requirement and to build an integrated strategic schedule for all force projection modes. Additionally, desired technologies will concentrate on USTRANSCOM's ability to coordinate the strategic schedule during mission execution to ensure that modal transshipments occur according to plan and that the strategic modal schedule can be adjusted (i.e. flexible and agile) when DTS components cannot meet the strategic schedule.

Basic Concept of AT2000 and Approach

Because ACTDs emphasize technology assessment and integration rather than technology development, it is not surprising that an underlying concept of AT2000 is a game plan on how technology will be used to improve the DTS. AT2000 seeks to provide a "structured approach" to identifying and leveraging technology investments made by the Defense Advanced Research and Projects Agency (DARPA), academic institutions, commercial industry, geographic CINCs, and Services in the technology areas of data management. The approach includes creation of DTS requirements and assets database; Scheduling and decision support; Human/Computer Interfaces (environment to support decision support tools); and System Support (e.g., LANs and connectivity to support demonstrations . The first two areas listed are the priority of effort for the USTRANSCOM because they represent the keys to successful management of the DTS. (Seaman 2001)

AT2000 development will take a dual path approach. Path one will look to specific ACTDs for maturing applications that can be applied against DTS requirements for development, collaboration, visualization, and situational awareness. Some of the similar existing ACTDs are introduced below:

- The Joint Logistics project is composed of two ACTDs that will develop and migrate interoperable web-based joint logistics decision support tools (JDSTs) to the Global Combat Support System (GCSS).

    - The initial Joint Logistics ACTD addressed Commander-in-Chief (CINC) and Service requirements to develop JDST capability in the areas of force capability assessment; logistics support concept generation and evaluation; distribution, materiel management, maintenance analysis; and visualization. (Mason 2001)
    - The Joint Theater Logistics ACTD integrates and expands upon those and other capabilities to provide real-time management and analysis tools for logistics and operations interoperability. Tools developed in this second ACTD are called Joint Theater Logistics Decision Support Tools (JTLDSTs) to distinguish them from the tools developed in the original ACTD. They focus upon forces associated with a Joint Task Force in a theater of operations. (Mason 2001)
- The Advanced Logistics Program (ALP) investigates and demonstrates technologies that will make a fundamental difference in transportation and logistics. ALP hopes to develop the following three areas:
    - Applications providing a technology environment that allows warfighters to rapidly understand and assess the logistics and transportation implications of a crisis situation, to generate effective plans and courses of action, to monitor a plan's execution, and to use that information to re-plan;
    - Automated systems which will enable significant efficiency improvements in transportation and logistics;
    - Computer network infrastructure that allows distributed real-time visualization and interaction with all phases, elements and components of the military and commercial transportation infrastructure. (Greaves 2001)
- The Commander-in-Chief 21st Century (CINC 21) ACTD addresses the critical need to accelerate the ability of decision-makers to understand the impact of events, and be able to collaborate, plan, and decide on appropriate courses of action with all essential parties wherever they are located. (AITS-JPO 2001)

AT2000's second development path approach will look at commercial supply chain scheduling sources, DARPA, Service labs, and academic sources for potential applications in the scheduling and decision support technology areas listed above. AT2000 will be structured around the Supply Chain Operations Reference model (SCOR) that has been developed and endorsed by the Supply Chain Council (SCC) as the cross-industry standard for supply chain management. SCOR will be the tool for determining how well we meet our measures of effectiveness (MOE). (SSC 2000) The following MOE have been established:

- **Create data capture tools to track assets and make smarter use of lift.** The goals are to: decrease errors in tracking by 50%, increase optimization capabilities by 40%, and increase data capture validity by 50%.
- **Provide rapid transportation services for faster and more flexible acquisition and delivery.** The goals include: increasing J3/J4 linkage, provide better pipeline visibility, and achieve measurable cost avoidance to the Services of $24.2M to USAF, $9.3M to USA, $4.7M to USN, and $1.8M to USMC.
- **Establish force projection & sustainment planning and sourcing.** Provide transportation plan to supported CINC within 4 hours after receipt of his movement requirements.

AT2000 Demonstration and Proposed Lead Agency and Sponsor

AT2000 will demonstrate and evaluate insertion of key technologies at these entry points: The Mobility Control Center (MCC) at USTRANSCOM, the three component commands (Military Sealift Command, Air Mobility Command, and Military Traffic and Management Command), and at Supported and Supporting CINCs. Joint Warrior Interoperability Demonstrations (JWIDs) and major CINC exercises will assess improvements to the deployment/redeployment operations of the supported CINCs. Technology insertion will concentrate on the receiving, qualifying, analyzing, deconflicting, and coordinating of lift requirements; orchestrating and optimizing use of lift assets through intermodal analysis; and providing customers (CINCs, Services, Agencies) responsive and efficient intermodal and multimodal service.

A final aspect of AT2000 bearing mention is the proposed lead Service/Agency. USTRANSCOM J5-SC has proposed that the lead service be the Air Force, the lead Agency be the Defense Information System Agency Advanced Information Technology Services Joint Program Office (DISA AITS JPO), and the User-Sponsor be itself.

Before analyzing the objectives of AT2000, a discussion on current supply chain initiatives will set-up the analysis. Since the supply chain initiatives began in the mid 1990s, there is no limit to the amount of information available in describing the initiatives. Therefore, the oldest supply chain initiative in the DoD, Velocity Management, and the newest and only joint initiative, the Strategic Defense Management Initiative, will be the focus of the next chapter.

Chapter 4

SUPPLY CHAIN MANAGEMENT INITIATIVES IN THE DOD

Introduction

> *The Army Strategic Logistics Plan will achieve the goals of that vision (the DCSLOG's Logistics Vision) by transforming Army logistics from a system based predominately on redundancy of mass, to one based on velocity, mobility, and information.*
>
> - *Army Strategic Logistics Plan (DSCLOG 2000)*

The classic starting point to understanding the DoD's supply-chain initiatives is to revisit the logistics philosophy prior to and during the Gulf War. During this time, LTG William Pagonis commanded the 22nd Support Command (SUPCOM) which orchestrated all logistical support during the ramp up, actual combat, and redeployment phases of Operation Desert Shield, Desert Storm, and Desert Farewell. His command moved over 7 million tons of supplies during war. At the beginning of the ground war, the 22nd SUPCOM had brought forward enough food and water to sustain the troops for 29 days, enough fuel to keep the entire force moving for 5.2 days, and 45 days of supply (DOS) of ammunition. (Pagonis 1992) At the conclusion of the ground war, four days later, 29 DOS of food, 5.6 DOS of fuel, and 65 DOS of ammunition remained in stock. This mass-based philosophy required logistics units to push forward “mountains of material” based on predictive planning plus “just in case” stockage.

Following the drawdown after the Gulf War, the logisticians recognized the need to improve supply-chain management based on reduced force structure. The U.S. Army working with RAND developed the Velocity Management (VM) Initiative while the U.S. Air Force was developing their Lean Logistics Initiative and the U.S. Marine Corps was developing their Precision Logistics Initiative. In 1998 the USTRANCOM developed the first joint supply-chain initiative called the Strategic Distribution Management Initiative (SDMI). This chapter will focus on VM and SDMI beginning with VM as the pioneer of supply-chain transformation in the military and concluding with SDMI.

Important differences exist in the definitions of logistics and supply chain management. Logistics as defined by the Council of Logistics Management (CLM) is “that part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customers' requirements.” (Stock 2001) Supply-Chain Management (SCM), on the otherhand, is “the integration of key business processes from end user through original suppliers, that provides products, services, and information that add value for customers and other stakeholders.” Since VM is a SCM-based initiative it is worthwhile to list the eight key business processes in SCM:

1. Customer relationship management
2. Customer service management
3. Demand management
4. Order fulfillment
5. Manufacturing flow management
6. Procurement

7. Product development and commercialization
8. Returns

These eight business processes represent major business decisions as well as significant constraints to maximizing company profits.

Velocity Management (VM)

Since 1995, the Army's Velocity Management (VM) initiative has brought a new way of doing business to U.S. Army logistics. As the term "Velocity Management" implies, this initiative focuses on improving the speed and accuracy with which materials and information flow from providers to users. VM replaces reliance on mass with the modern business concept of high-velocity processes tailored to meet evolving customer needs. --Insert Table 1(RAND 2001)-- VM views the logistics system as a set of interlinked processes -a supply chain- that delivers products and services (such as spare parts and equipment maintenance) to customers. System performance is assessed in terms of the agility and responsiveness of logistics process. Ultimately, VM enhances total logistics performance and achieves real dollar savings as the Army replaces the supply mass of "Iron Mountains" with distribution velocity, precision, and speed through tailored logistics packages that provide versatility and mobility to the warfighters. (Pagonis 1992)

Method of Improvement

To implement the VM system, the Army has institutionalized a continuous improvement method consisting three steps: **D**efine the process, **M**easure the process, and **I**mprove the process. (RAND 2001)

- **Defining** the Process: producing a clear picture of the order fulfillment process that is common to all participants and stakeholders. "Walking the process" cuts across many organizations, both military and commercial, and includes visits to inventory control points, wholesale supply depots, and installations.

- **Measuring** the Order Fulfillment Process: VM teams initially focused on improving the time dimension of the order fulfillment process. During walkthroughs, VM teams found that processes were being managed with metrics that focused on local effectiveness but did not necessarily result in good overall customer service. This focus was facilitated by the existence of an Army dataset called the Logistics Intelligence File (LIF) that contained customer wait time (CWT) data for orders for spare parts that were placed by Army units and filled by wholesale sources of supply (primarily DLA supply depots).
- **Improving** the process looks for activities that are wasteful or that add little value, on large scales and small. Examples of wasteful activities include:
  - Unnecessary motion in materials handling (similar to Fredrick Taylor's Scientific Management – Time Motion Studies (Shafritz 2001))
  - Unnecessary transportation (central receiving point (CRP) vs. direct delivery)
  - Long periods of waiting (waiting several days for a truck to fill up)
  - Large stocks of inventory (a sign of long lead time or high variability)
  - Overprocessing (shipping on premium transportation when a less expensive mode is just as fast and reliable.)
  - Overproduction (making or repairing unneeded or excess items)

-- Insert Table 2 (RAND 2001)--

Organization Structure of VM

The Army recognized the need for high-level commitment and strong organizational structure to insure the success of the Velocity Management initiative based on the complexity of its supply-chain. Three senior Army general officers (the Army's Deputy Chief of Staff – Logistics (DCSLOG), the Deputy Commanding General of the Army Material Command, and the Commanding General of Combined Arms Support Command) lead and sustain the initiative and form what is called the VM Board of Directors (or simply the Velocity Group (VG)).

The VG oversees two types of teams to implement VM. Technical experts representing all segments of the supply-chain, as well as RAND analysts, form Process Improvement Teams (PITs). The PITs find and eliminate non-value-added processes that cause delays in the Army's supply chain. There are currently eight PITs: Order and Ship Time(OST) (also called the Customer Wait Time (CWT) PIT), the Repair Cycle PIT, the Stockage Determination (SD) PIT, the Finance Management (FM) PIT, the Deployed Operations PIT (DO PIT), the Transportation (TRANS) PIT, the United States Army Reserve PIT (USAR PIT), and the Army National Guard PIT (ARNG PIT). (Miracle 1999) The primary PITs will be addressed in greater detail below.

The second type of team involved in VM is the Site Improvement Team (SIT). Local technical experts and managers at the installation level form these teams. Both teams apply the **D-M-I** method to local and global processes and serve as a mechanism for implementing improvements Army-wide. Since the development of VM, the PITs and the SITs have achieved great improvements for the Army. The next part of this chapter will feature the PITs and present their achievements in SCM.

VM PITs and Their Achievements

Order and Ship Time (OST)/Customer Wait Time (CWT) - The OST/CWT PIT focuses on the wholesale and retail levels to streamline the distribution and storage of supplies. In particular, the Army now uses CWT as the principal metric for measuring aggregate logistics performance. CWT captures the time from when a customer orders an item until the order is filled.

The efforts by the OST PIT over the past three years have enabled the Active Army to reduce its total inventory more than 50% by reducing its OST by more than 60%. The improvements were measured again benchmarks obtained from data during 1994 – 1996: CONUS – 22.4 days, OCONUS (Air) – 25.3 days, OCONUS (Land) – 55.5 days. (Keane 2000) The OST improvement is a direct result of the use of scheduled, dedicated trucks. These trucks bypass central receiving points (CRP) whenever all their cargo is destined for one customer, or they deliver all their cargo to the CRPs that can deliver the deliver supplies, sorted by Supply Support Activity (SSA) Department of Defense Activity Address Code (DODAAC), to multiple SSA with smaller trucks and dedicated routes. Over the past 3 years, the soldiers at Fort Bragg in conjunction with the dedicated workers at DLA depots, have reduced OST for class IX by 69 percent through the proficiency of the installation CRP. Other installations have shown similar OST reductions: Fort Hood by 65%; Fort Irwin by 55%; and Fort Campbell by 52%. (Walden 1999) Four examples of OST/CWT PIT follow that highlight the success of the OST/CWT PIT.

In August 1995, a team from CASCOM, the Logistics Integration Agency (LIA), and RAND visited Fort Irwin and implemented several changes (Walden 1997): (1) A material release order (MRO) control system and the automated manifest system (AMS) were fielded to the Fort Irwin CRP and the CL IX main stock location in November 1995. These systems receipted parts to customers quickly. As a result of these improvements, the OST for 95% of all requisitions had dropped to 15 days by February 1996. (2) The National Training Center (NTC) logistics cadre presented results of the reduced OST to the semiannual authorized stockage list (ASL) board, along with the recommendations to add 1,815 items to the NTC ASL, reduce the quantity of 1,696 items, increase the quantity of 1,903 items, and delete 343 items, which reduced the dollar value of the ASL by over $9 million. (3) The Material Management Center (MMC) item managers called-in high-priority requisitions that were not stocked or were at zero balance at the class IX main stock location to the inventory control point. The turn-in operational rate of tracked vehicles increased 7%; for wheeled vehicles the rate increased 3% and the average OST for high-priority requisitions was reduced from 17.9 days to 6.9 days.

A second example of CWT success is seen in a partnership between the Defense Distribution Depot Susquehanna (DDSP), New Cumberland, Pennsylvania and partnered with the Intermediate Supply Support Activity (ISSA), at Camp Lejeune Marine Corps base, North Carolina. (Editor 1997) Consolidating reporting unit codes (RUC) at the ISSA, the Marine Corps equivalent to DoDAACs, and consolidating like unit's stock in tri-walls reduced handling by the ISSA, expedited issuing, and reduced OST. Secondly, segregating loads by DDSP destined for the ISSA's four main RUC's and loading sequentially onto the dedicated truck resulted in a great reduction in materials handling and improved loading times and therefore, reduced the OST. Lastly, modifing shipment delivery by coordinating with the carrier to schedule deliveries at a time when ample employees are available for offloading achieving lower OST, reduced inventories, and ultimately cost savings.

U.S. Army Tank-automotive & Armaments Command (TACOM) provides the third example of OST/CWT PIT success. The PIT reduced the OST for the TACOM's high-mobility, multipurpose, wheeled vehicle (HMMWV) bias-ply tire by implementing a direct vendor delivery/ electronic data interchange (DVD/EDI) requisitioning system. The new requisition processing system decreased the average OST for a tire by an average of 24.4 days, or 37%. Once all TACOM items were included in the system, the OST for the lowest priority item was only 10 days longer than the OST for the highest priority item. (Kucyk 1997)

The final example of OST PIT success is the OST Team and DLA development of a SCM concept called Prime Vendor. This concept seeks to reduce OST by commercial EDI networks that update inventories automatically, issue materiel releases against purchase orders, send invoices to customers, pay suppliers, generate bills of lading, and provide shipment information. Two outstanding results following the transition to Prime Vendor (Editor 1998): (1) DLA created the Army Food Management Information System (AFMIS) to enable dining facility managers to request and receive subsistence with 48 hours from a Subsistence Prime Vendor. (2) In October 1998, DLA's Defense Personnel Support Center (DPSC) implemented Virtual Prime Vendor at the clothing initial issue points (CIIP's) that support the Army's soldier initial entry training mission at five installations. Under this PV program, CIIP's were able to reduce stocks, reduce workload, and save money because they substituted velocity (reducing OST) for mass clothing (over 6,090 DOS) that had previously been warehoused.

Since the OST/CWT Team represents the "velocity" in VM, there has undoubtedly been great emphasis on this area accounting for the tremendous accomplishments of the team. Since the VM initiative seeks to replace mass with velocity, the corresponding PIT that accounts for inventory is the Stockage Determination (SD) PIT.

Stockage Determination (SD) PIT **–** The SD PIT looks at the inventory management (IM) process to determine which items and how many of each to stock at an installation's local supply warehouses. Stockage decisions require a tradeoff among customer performance objectives, cost, and mobility requirements. The SD PIT developed two sets of metrics to evaluate IM: performance metrics and resource metrics.

Performance metrics focus on the time and quality dimensions and include (RAND 2001):

- Equipment readiness: The percentage of weapon systems that are operational.
- Customer Wait Time (CWT)
- Fill rate: The percentage of customer requests that are immediately filled from a given inventory point
- Accommodation rate: The percentage of requisitions for items that are regularly stocked whether or not the item is available at the time of request (also called the inventory “breadth”)
- Satisfaction rate: The percentage of accommodated requests for which there is stock available at the time of the request to issue to the customer

Resource metrics focus on the cost of inventory. Capital investment in inventory is a sunken cost; therefore, the SD PIT tries to minimize inventory while still achieving high fill rates for the customer. Resource metrics include (RAND 2001):

- Inventory Investment: The dollar value of the requirements objective (RO). Also, the dollar value of the reorder point (ROP, the inventory level at which replenishment is initiated) and dollar value of inventory greater than the RO
- Transition Costs: Investments to increase inventory levels of existing lines or to add new lines and include credits from excess turn-ins
- Workload: The level of activity required to fill orders and to maintain inventory levels
- Mobility: The number of lines or types of items - another form of this is the number of cubic feet that is represented by the RO, calculated as the sum of the cubit feet of each item as if held at the RO quantity
- Number of trailers or containers used to store inventory

The SD PIT’s achievements facilitate the achievements of the OST PIT and vice-versa. In 1998, the late MG James Wright took over the leadership of the SD PIT and encouraged the team to develop categories for evaluating inventory items based on cost range. Initial study of the Army Master Data File (AMDF) revealed that over 75% of the items on the AMDF cost less than $100. (Walden 1999) The SD PIT studied demand data for one division over a year and discovered that 71 percent of the items ordered from wholesale as not mission capable supply (NMCS) cost less than $100 and that over 36% cost under $10.

With this benchmark, the SD PIT brought about two profound achievements at Ft. Campbell: (1) The SD PIT focused on realigning authorized stockage lists (ASLs) at Ft. Campbell to push more stocks down to forward support battalion ASLs, resulting in broader ASLs across the installation with a reduction in their value from $19 million to $9.2 million. (2) The SD PIT in conjunction with RAND analysts developed a modified Economic Order Quantity (EOQ) algorithm for determining stockage levels called Dollar Cost Banding (DCB). DCB serves as an alternative ASL stockage determination and allows for stockage of repair parts at the retail level without degradation to mobility and increases to stockage costs. DCB emphasizes increased stockage of low dollar items and variable CWT targets to optimize ASL stockage breadth and depth without increasing ASL costs, weight, and cube. (Keane 2000)

Repair Cycle Time (RCT) PIT – The RCT PIT focuses on improving the accuracy of diagnostics to ensure that the right part is ordered to correct a deficiency or fault. The Repair PIT defined the repair cycle as extending from the time an item is broken until it is fixed, as opposed to the Army's traditional definition which was limited to hands-on repair time in the shop. Following initial site walk-throughs, the team made several changes to the SCM business processes involved in the repair cycle, including: procedural changes to reduce administrative workload; elimination of repetitive inspections; and unnecessary cleaning procedures to save maintenance, manpower and time. (RAND 2001) The RCT PIT worked diligently to map the processes used at the Army's maintenance depots and integrated sustainment maintenance (ISM) sites and found that some installations are repairing some items into the ISM program at a rate that is as much as twice the consumption rate. The RCT PIT assisted these installations by addressing the two reasons for the trend: not checking the demand data before repairing items or not checking the due-in-from-maintenance file before passing a requisition from the manager review file. (Walden 1999)

The RCT PIT focuses on methods to streamline the repair process and the maintenance-to-maintenance retrograde process in order to maximize the productivity of mechanics and to improve readiness. The team also works closely with the Army Materiel Command's (AMC) Logistics Support Activity and the field to make the Work Order Logistics File (WOLF) database more accurate.

As a result, the Army-wide mean time to repair (MTTR), for both components and end items, is down 35 percent over the past 3 years. (Walden 1999) They were also able to achieve a 38% reduction in mean RCT during FY 95 – 98. (RAND 2001) These improvements are particularly remarkable at the 95th percentile indicating that the process became much more reliable in its performance. The RCT PIT continues to create new tools to track the entire Army supply-chain's performance in repair.

Summary

Highlighting the preceding PITs enables the reader to understand the direction and success of the VM initiative. --See Table 3 (RAND 2001)-- VM has tremendous support from the DoD level as well as the Army's leadership as evident by the Quadrennial Defense Review and the Army Strategic Logistic Plan's inclusion of the following:

- "Compress the Supply Chain…. The Department has made some recent advances in reducing inventories of common consumable items and in promoting practices like direct vendor deliveries. DoD also incurs significant overhead costs for functions that vendors could perform. Performance-Based Logistics and modern business systems with appropriate metrics can eliminate many of these non-value-added steps." (DoD 2001)

- "Reduce Cycle Time. Every reduction in cycle time brings improvements in efficiency and reductions in cost. Private sector benchmarks should set the standard for government providers, whether the function is processing and paying a bill, moving a part from a supply center or depot to a field unit, or making the transformation from concept to employment." (DoD 2001)
- "Velocity offsets mass, as echelons of inventory are replaced by managed flows of materiel. The key is timely and accurate information on the inventory that is in motion. The distribution pipeline effectively becomes the Revolution in Military Logistics (RML) warehouse." (DCSLOG 2000)

Since VM and other Service SCM initiatives are limited in scope by their Service, the need for a Joint/DoD wide SCM reform became apparent in the mid-1990s. The United States Transportation Command (USTRANSCOM) and the Defense Logistics Agency (DLA) recognized the limitations of service-specific logistics initiatives and developed the Strategic Distribution Management Initiative (SDMI) to streamline the DoD global distribution system.

Strategic Distribution Management Initiative (SDMI)

Lieutenant General Brown, Deputy Commander-in-Chief USTRANSCOM, believes that "SDMI is an aggressive, fact-based program to provide process improvements that balance customer service, cost, readiness, and sustainability." (USTRANSCOM 2001) SDMI advocates do not seek to create or purchase major systems or demand large capital investments. These advocates seek to improve the supply-chain process through the same DMI process improvement methodology used by the VM Team. As a result, they hope to synchronize joint supply and transportation processes at the strategic (wholesale) and theater (retail) levels.

SDMI Committees

SDMI uses four committees to break-up and analyze the supply-chain: the Stockage committee, the Surface Committee, the Air Distribution Committee, and the Financial Management Committee. A flag officer heads each effort in consultation with the Office of the Secretary of Defense (OSD), the Joint Staff, and Service representatives.

The Stockage Committee falls under the leadership of the DLA's Defense Distribution Center. This committee seeks to improve stock levels at the agency's strategic distribution locations to accelerate delivery to customers. The Military Traffic Management Command (MTMC) heads the second committee, the Surface Distribution Committee. MTMC desires to improve container performance and to reduce surface CWT by improving the synchronization between depot, port, and ship. The third committee, the Air Distribution Committee, falls under the leadership of the Air Mobility Command Director of Operations (AMC/DO), and is rapidly improving cargo delivery. The committee strives to achieve time-definite delivery to the customer through airlift or, if necessary, crossload to surface lift to ensure rapid delivery. Lastly, the Financial Management Committee looks for ways to improve financial tracking and processing of freight movements throughout the DTS. The committee examines the latest technology in EDI commerce for rapid payment of tenders upon delivery of cargo.

ITV Deficiencies identified by SDMI

In SDMI, ITV is the foundation for SCM improvements and the vehicle by which DTS stovepipes broken down and yielding a global perspective materiel in the DTS. ITV specifically refers to the ability to track the identity, status, and location of DoD unit and non-unit cargo, passengers, and medical patients from origin to the "foxhole", during peace, contingencies, and war. As the single manager for the Defense Transportation System (DTS), USTRANSCOM has developed GTN as its command and control (C2) automated information system. GTN provides the automated tool for C2 and business operations of the DTS. ITV is a by-product of USTRANSCOM's operations, and GTN provides ITV for all DoD customers. GTN gathers data from a number of DoD, Services, agencies, and commercial transportation feeder systems to satisfy USTRANSCOM's C2 needs and DoD's ITV needs.

The standards for success in ITV, as defined by USTRANSCOM in SDMI-Europe (SDMI-E), are: achieveing 100% visibility of EUCOM sustainment cargo; meeting the established DoD and EUCOM ITV Data Timeliness Criteria (DLA 2001):

- Sustainment Airlift: All arrivals and departures of sustainment air cargo at all nodes from origin to destination will be visible in GTN within 1 hour of the event.
- Sustainment Sealift: All arrival/departures at all nodes from origin to destination will be visible in GTN within 4 hours of the event.
- Intratheater and CONUS movements: The arrival and departure at all nodes of non-unit cargo originating or terminating in a theater of CONUS will be visible in GTN within 2 hours of the event.

and following the Joint Vision 2020 Focused Logistics Transformation Path (JCS 2000; Staff 2000). The path specifies the following timeline:

- FY01- implement systems to assess customer confidence from end to end of the logistics chain using customer wait time metric.
- FY02 - implement time definite delivery capabilities using a simplified priority system driven by the customer's required delivery date.
- FY04 - implement fixed and deployable automated identification technologies and information systems that provide accurate, actionable total asset visibility.
- FY04 - for early deploying forces and FY06 for the remaining forces, implement a web-based, shared data environment to ensure the joint warfighters' ability to make timely and confident logistics decisions.

On August 2nd, 2001, LTC Grothe, USTRANSCOM J-4 LPI, briefed the status of these goals to primary CONUS-to-EUCOM supply-chain and ITV managers as part of an

ITV Terrain Walk. Important air ITV deficiencies included the Ramstein Air Mobility Operations Group (AMOG) personnel were unable to use hand-held readers (HHR) to in-process cargo into Global Air Transportation Execution System (GATES) due to frequency issues. Also, reportable events "manually" entered into automated information systems (AIS) are unreliable. Finally, Defense Depot Susquehanna, Pennsylvania (DDSP) workers did not put Radio Frequency (RF) tags on some of pallets leaving the depot. (Grothe 2001)

Surface ITV for the CONUS-to-EUCOM logistics pipeline is based on capabilities at the seaports of embarkation (SPOE) – Norfolk, Portsmouth, and Port Elizabeth and seaports of debarkation (SPOD) – Antwerp and Rotterdam. Deficiencies for surface ITV included multiple AIS, partial/incomplete automated information technology (AIT), and heavy emphasis on the commercial carrier value-added service of EDI. Norfolk is the only SPOE to have RF capability (at the truck gate and air pallet yard only), but both Antwerp and Rotterdam have RF instrumentation at the port, although there are some restrictions at Rotterdam. DLA shipped 9,360 containers to EUCOM in the past 12 months sending 0% to Norfolk, 99% to Portsmouth, and 1% to Port Elizabeth resulting in no RF feeds into the Global Transportation Network (GTN) from the SPOE for all these shipments (Grothe 2001). Furthermore, only 3% of the shipments went through Antwerp where full RF technology sends asset visibility information to GTN.

Success resulting from SDMI

The Air Distribution Committee, DLA, and USEUCOM partnered to run the SDMI Air Distribution Test (SAD-T) - ALOC pallets built at Susquehanna are expedited by truck to Dover AFB, processed and shipped on the next day express mission to Ramstein Air Base, Germany; and from Ramstein it is shipped down to Tuzla, Bosnia or Tazar, Hungary. Through this partnership, CWT has improved from an average of 15 days down to an average of nine days CWT since the July 1, 2000 start date. (USTRANSCOM 2001) The partnership found that if material is properly positioned, for example at Susquehanna, and linked to scheduled strategic/theater lift, they could match, and in some cases, beat the delivery times of World Wide Express service – the contracted priority airlift provided by DHL, FedEx, and UPS. The SAD-T resulted in a 4.4 days average CWT to Tuzla where WWX took on average 5 days. SAD-T cargo was delivered 12 percent faster than WWX and cost less the shipper. WWX service down to Tuzla/Tazar charged customers $6/pound, but the SAD-T Milair service is approximately $2.40/pound.

The success SAD-T was part of the Strategic Distribution Management Initiative in Europe (SDMI-E) that began in July 2000. The keys to these outstanding results were: (1) cargo on strategic airlift arriving at Ramstein A.F.B. from Dover A.F.B. (C-5's and C-17's) were transshipped to C-130 aircraft if available, and (2) If no C-130 aircraft are available, a commercial truck is loaded with the cargo for a two-day mission to the Balkans. The commercial truck maintained the velocity of the shipment by accepting the cargo loaded on Air Force 463L pallets without requiring the pallets to be broken down and sent to a break-bulk terminal. USEUCOM relied on DLA and USTRANSCOM to restrict the height of the pallets because of the vehicle height restrictions enroute to Bosnia. The private sector responded by creating an "intermodal pallet" that came to the theater via strategic airlift and could be transshipped to C-130 aircraft or commercial truck without violating height or weight restriction on either mode (MTMC 2001).

Similary, the Surface Committee improved CWT by scheduling containers for the next available vessel instead of the next scheduled lift. The committee achieved a decrease of 13 days in CWT (from 59 days to 46 days) for cargo destined for Europe. (MTMC 2001) The Surface Committee also improved ocean container booking by reducing the one-time-only shipment processing time by 70% in 12 months. The integrated booking response to carriers was 29 hours and is now just 20 minutes (USTRANSCOM 2001).

SDMI has also allowed the US Navy to restructure its supply-chain. According to Kevin Fitzpatrick, assistant deputy commander, Fleet Logistics Operation, US Naval Supply Systems Command, “the $6.5 billion Naval System was losing customers because of a 57.5% surcharge it imposed on supplies.” (Cottrill 2001) Problems adding costs to the command’s supply-chain included improper failure-driven metrics based on fill rate as well as stove-piped information systems with minimal integration run by inefficient legacy computer systems. For example, ordering a gyroscope for an aircraft involved 35 physical moves, 29 organizations, 52 information transactions, and 11 systems. To streamline its logistics system, the command outsourced parts management to the private sector in November 2001. The private sector can implement a single logistics system that incorporates supply and maintenance with a command database. The goal for the company providing these services for the Naval command is to develop a web-based fleet supply system which enables the users to submit requisitions online and provide “best-value shopping” services. The Navy Inventory Control Point in San Diego repositioned stocks of 110 items to Defense Depot San Joaquin, California, resulting in an 8.6-day reduction in CWT. (USTRANSCOM 2001)

SDMI and Velocity Management are improving ITV through the Logistical Support Agency's (LOGSA) Pipeline Tracker – EDI Enhanced (PT-E^2) system (Team 2000). PT-E^2 provides the capability to track small package, surface, and ocean carrier commercial shipments via the web. PT-E^2 fills data voids in the Logistics Information File (LIF), such as port receipt and lift, which occur when materiel moves directly from a vendor or depot, to a Supply Support Activity, by commercial means (e.g. FedEx, DHL, and Emery). The key is a commercial carrier supplied EDI shipment status transaction, which links the DoD depot Transportation Control Number (TCN) to a commercial tracking number. The PT-E^2 inquiry system provides both the current shipment location, and a complete pipeline history. The result of PT-E^2 is enhanced ITV and more timely logistics pipeline data.

A final example of the success of SDMI is at the Defense Distribution Center (DDC), New Cumberland, Pennsylvania. The DDC decreases overall freight costs by identifying strategically placed stocks and shipping them to OCONUS locations through consolidated large volume moves. Decisions to position stocks result from in-depth customer demand analysis and allow units the opportunity to use economic order quantity (EOQ) methods for scheduled deliveries and low-cost transportation. The benefits for the positioned stocks therefore include shorter CWTs (through time-definite deliveries) and reduced transportation rates (through less-expensive surface movement to the theater). The redistribution of materiel through demand analysis and strategic positioning resulted in a 15 percent reduction in customer wait time in 2001 global surface transportation movements to the CINC geographic regions. (Service 2002) Reductions in customer wait times, between 1999 and 2001, include: Bosnia, 37 percent; Kuwait, 32 percent; and Saudi Arabia, 17 percent. More efficient transportation to the United Kingdom has resulted in a switch from airfreight to truck movement resulting in a 70 percent transportation cost savings.

Summary

Joint/DoD wide SCM reform is a reality through SDMI. Technology enabled USTRANSCOM and DLA to view the entire supply-chain and breakdown stove-piped logistics. The achievements of SDMI not only save millions of tax payer dollars annually, they increase the readiness of units forward deployed to Europe, the Pacific, and to the Middle East.

ITV provides the means to track and measure the pipeline. Without real-time ITV, SDMI cannot achieve these impressive results. The deficiencies in the ITV in Europe and the East Coast of the U.S. must be addressed and remedied to enable SDMI to continue to improve the supply-chain.

SDMI and VM are successful logistics initiatives that are achieving a Revolution in Military Affairs. They enable logisticians to deliver cargo to the warfighter with increasing time-definite assurance while decreasing the footprint (stockage) required to achieve the desired mission support.

Chapter 5

ANALYSIS OF AT2000 OBJECTIVES

Introduction

In my view, the Department (Transportation School – Fort Eustis) and the PM (TC-AIMS II Project Manager) must redirect its attention to focus now on developing theater deployment and distribution C2. … To this end, I am working on trying to partner more with JFCOM and other joint funded programs which focus on rapid integration of forces on the front end; speed and operational momentum during multi and inter modal/nodal ops; and theater movement and distribution C2.

-MG Dail, Chief, U.S. Army Transportation Corps (Dail 2001)

The preceding quote by MG Dail, Chief of the Army's Transportation Corps, serves as a proper stepping-stone to begin the analysis comparing the specific objectives of AT2000 with the SCM initiatives VM and SDMI. MG Dail is pushing the Army Transporters to focus on "distribution C2", "rapid integration of forces on the front end", and "speed and operational momentum during multi and inter modal/nodal ops". (Dail 2001) His goals are similar to the objectives of AT2000 mentioned in Chapter 3 restated below:

Objectives of AT2000:

1. Insert key database and scheduling technologies into the DTS to improve its management process
2. Provide the Commanders in Chief (CINCs) and individual Services more responsive and efficient intermodal and multimodal service
3. Establish the framework to ensure continuous DTS improvements

This analysis will examine these objectives through the eyes of supply-chain managers in the DoD. The goal will be to answer, "How will AT2000 objectives, if successfully implemented, affect the supply-chain initiatives Velocity Management (VM) and the Strategic Distribution Management Initiative (SDMI)?" Therefore, each AT2000 objective will receive individual analysis through supply-chain lenses in the pages that follow.

OBJECTIVE 1

AT2000's first objective is to "insert key database and scheduling technologies into the DTS to improve its management process". There are two explicit tasks in this objective – implementation of both database technologies and scheduling technologies. Each task seeks to improve management of cargo throughout the DTS.

Insertion of Key Database Technologies

Database management systems allow application programs to retrieve required data stored in the computer system. Because AT2000 seeks to insert key database technologies into the DTS, AT2000 project managers are keenly aware of the capabilities that databases can offer managers. Databases became increasingly important with the creation of electronic data interchange (EDI). EDI is the "interorganizational exchange of business documentation in structured, machine-processable form". (Emmelhainz 1990)

There are three primary types of EDI systems currently in use: proprietary systems, value-added networks (VANs), and the Internet. (Stock 2001) Proprietary systems use an EDI system that is owned, managed, and maintained by a single company that buys from a number of suppliers or receives directly from customers. VANs, or 3rd party networks, use a central data “clearinghouse” to allow suppliers and buyers access to pertinent data while providing compatibility for all computer systems involved. Finally, the Internet is becoming the newest form of EDI system providing EDI in real-time at little or no cost to the user. All of these systems require databases to access the desired information.

Management information systems (MIS), such as AT2000, require a common database and appropriate EDI systems to enable it to retrieve, process, and analyze data as well as generate reports. Supply-chain managers use MIS to track critical logistics functions including selection of modes, freight consolidation, vehicle scheduling, rate negotiation, shipment routing and scheduling, railcar management, and carrier selection. Logistics MIS reports typically include order performance, inventory management, shipment performance, damage in shipment, transportation administration, and costs.

Enterprise resource planning (ERP) is a widely utilized commercial MIS that seeks to integrate through a single database where there is a common understanding to what the shared data represents and a set of rules for restricting access to the data. ERP systems are criticized, however, for their inability to cope with complex networks where many distinct systems span the entire supply chain. (Richmond 1998) Since the DTS is a very complex supply-chain pipeline, there are obvious difficulties with a common database capable of real-time database management. AT2000’s intent to insert up-to-date database technologies supports good supply-chain management practices, and therefore supports VM and SDMI, but AT2000 may resort to a web-based Desktop data-retrieval system, such as the Global Transportation Network, which accesses over 30 systems to provide real-time ITV. (DLA 2001) --See Table 4 (HERBB 2002)--

Insertion of Key Scheduling Technologies

AT2000 seeks to put more agility into the DTS by inserting key scheduling technologies. These technologies will efficiently manage the DTS through mode determination and optimization as well as give USTRANSCOM the ability to coordinate the strategic (port to port) schedules during mission execution. This will ensure that modal transshipments occur as planned and that the strategic modal schedule (time phased force deployment data (TPFDD)-directed or sustainment cargo) can be adjusted when DTS components cannot meet the strategic schedule.

The USTRANSCOM Joint Mobility Control Group (JMCG) is the focal point for implementing this technology. The JMCG will provide the operational focus for insertion and evaluation of technologies focused on collecting, transmitting, assimilating, processing and analyzing data. JMCG will have real-time ITV of shipments, but unless a database management system providing TAV of materiel and transportation resources is developed, the JMCG will not have all the information necessary to make schedule/mode adjustments.

USTRANSCOM, through SDMI, hopes to streamline the distribution pipeline. The task of scheduling requires making efficient transportation decisions while also improving the distribution process. They must identify shortfalls early and establish back-up delivery modes to ensure success. Therefore, this task supports supply-chain management by improving flexibility and C2 in the DTS.

Benefits/Disadvantages

Benefits - Through EDI and effective database management, DTS managers can achieve: (1) reduction in paperwork, (2) improved accuracy due to reducing human-error,

(3) increased speed of order processing, (4) increased productivity of employees through a less cumbersome management system, (5) reduction in costs to process orders, (6) improved information availability due to speed of acknowledgements, (7) reduction of workload and improvement through AIT/AIS, and (8) reduced inventory due to improved accuracy and reduced cycle time. (Stock 2001) All of these benefits parallel VM and SDMI benefits.

Through an improved scheduling capability, the DTS managers can improve on mode determination, which in turn reduces OST for VM and SDMI. Schedulers with a management capability can: provide total visibility of all requirements and available assets, foresee bottlenecks in the DTS, and make an informed decision on intermodal analysis and mode determination. This capability further improves supply-chain management by improving the transportation function.

Disadvantages – Two primary disadvantages potentially block AT2000's first objective from supporting VM and SDMI. First, if the database technologies are limited to ERP products, then database objectives may prove too difficult to achieve. GTN began as a database system that retrieved and processed periodic updates from more than 20 feeder systems, but as GTN interfaced with more and more systems, it was transformed into a web-based system that drew information from over 30 sources only when the user wanted the information. AT2000 will no doubt resemble a web-based platform in order to achieve real-time information for the entire DTS.

The second disadvantage is that there is not a sufficient DoD TAV currently in use. Agility in scheduling is possible only through a DoD TAV system that can provide not only inventory status of all materiel but also movement capability status. If TAV can be obtained through a web-based system, then AT2000 can fully support VM and SDMI, but since a TAV system does not currently exist, an obstacle exists for AT2000 to overcome. Additionally, the Army looks to Global Command and Control System - Army (GCSS-A) to integrate all the Army's legacy logistics information systems to lay the foundation for a "seamless" logistics management system from a user perspective. (DCSLOG 2000) Therefore, not only is there an insufficient system for TAV, there is also competition from the Army and other Services for a TAV system that promotes efficient use of the DTS.

OBJECTIVE 2

AT2000's second objective seeks to provide customers with responsive and efficient intermodal and multimodal service. This objective seeks to puts transportation planning tools into the hands of the decision makers. This objective falls under the emerging field of transportation requirements planning (TRP) systems. These systems allow shippers and carriers to share information regarding transportation movements and to improve the efficiency and effectiveness of freight flows. TRP systems can fall under Enterprise Resource Planning (ERP) systems or can be stand-alone systems.

A basic model for a TRP system contains inputs to TRP, TRP itself, and outputs from the TRP system. --See Table 5-- Two primary inputs to a TRP system exist: shipper requirements and carrier capability. The distribution of the product is driven by purchase orders, customer orders, and replenishment orders, all of which represent demand variability into the system. The second input, carrier variability, includes equipment availability (multimodal and intermodal services included), rates, and allocation goals (10% by air, 50% by less than truckload (LTL) carrier, and 40% by rail or inland waterway, for example). If AT2000 is to achieve its second objective, it must obtain these two inputs for the feeder systems in the DTS. EDI-based systems provide the customer requirements for the VM and SDMI initiatives and therefore are available to AT2000, but no system currently exists in the DTS that provides consolidated resource availability. AT2000 must link and receive electronic feeds from all transportation capability systems such as the World Port System, the Department of the Army Movements Management System – Redesigned, the Transportation Coordinator's Automated Information for Movement System II, the Command and Control Information Processing System, the Consolidated Air Mobility Planning System, and the Consolidated Aerial Port Subsystem II. (Coyle 2000)

TRP outputs fall into four areas: optimal shipment planning, status reporting, performance reporting, and planning and analysis. Optimal shipment planning is the purpose of the TRP system. A TRP system must have the capability to maximize transportation utilization through efficient (minimum distribution costs) or effective measures (minimum CWT). The second TRP output, status reporting, is currently available in the DTS through GTN. In-transit shipments pass through multiple radio frequency interrogators providing real-time information to customers. AT2000 can either interface with GTN to provide status reporting or develop its own capability to access over 30 EDI-systems that feed GTN. The third output is performance reporting. Performance reporting is another hurdle for AT2000 to clear. GTN does not provide a carrier performance information database, but it does file shipment records six months after delivery is made. AT2000 must develop the capability to log transit times for all modes of transportation in the DTS and to use performance criteria in TRP. Finally, the fourth output of TRP is planning and analysis. This output couples the performance reporting output with an analysis tool to assist decision makers. The analysis tool allocates transportation assets based on statistical analysis of variance among the modes of transportation available to the shipper and carrier. This type of output is attainable through COTS statistical analysis packages and can be embedded into AT2000. The greater assumption here is that future AT2000 operators will be able to utilize this capability.

Penske Logistics developed a TRP system called the Logistics Management System (LMS). The LMS automated regular routes and improved efficiencies, delivery times, and vehicle utilization in servicing Wawa stores. (Penske 2002) Similarly, Penske’s LMS enables Penske to maximize efficiency and utilization while delivering freight from Big Lots' distribution centers to its network of stores around the country. (Penske 2002) Penske combined its LMS technology with a dedicated fleet and created an interface with Big Lots' mainframe system to analyze weekly demand information and then develop the optimal weekly routes for each truck and trailer. Additional information about vendor pickup dates and times revealed backhaul opportunities that further reduced cost for Big Lots.

This second objective of AT2000 introduces a revolutionary effort to provide real-time aggregate capability by mode by location to assist the transportation planner in making optimal transportation execution. This objective has clear benefits for the supply-chain management initiatives.

Benefits/Disadvantages

Benefits - The primary purpose of AT2000 is to provide a *holistic* transportation decision support system which will provide agility while ensuring mission accomplishment. The *holistic* part of this objective is based on AT2000's ability to collect real-time transportation asset capability. If AT2000 can capture asset information from feeder systems, then the DTS can move away from the current stove-piped transportation planning and execution systems. Centralizing transportation planning will enable the DoD to achieve efficient or effective transportation. If AT2000 is developed and utilized to maximize transportation effectiveness, AT2000's second objective will align perfectly with the supply-chain management initiatives VM and SDMI. Effective transportation shortens CWT; AT2000 can assist the logistician in reducing safety stock because it provides time-definite, priority transportation.

Disadvantages – If AT2000 is developed to increase the efficiency of the DTS, it will conflict with the goals of VM and SDMI. VM and SDMI offer the logistical planner the ability to save millions of dollars through the reduction of on-hand inventory based on the belief that the CWT will decrease or that delivery length will be extremely predictable. AT2000, used as an efficiency tool, will reduce the number of "truckloads" to increase truck utilization (weight or cube per truckload). Because the cost of transportation has remained nearly constant for the past 30 years and the cost of inventory has greatly increased over the same period, the decision to use AT2000 as an effectiveness tool is more likely. The risk of confliction of interests between VM and SMDI and AT2000 therefore is unlikely.

OBJECTIVE 3

AT2000's final objective seeks to establish a process to transition emerging technology to ensure continuing improvement of DTS. To achieve this objective, the AT2000 managers will use two methods: (1) push AT2000 as a Joint Decision Support Tool (JDST) and obtain technology and information sharing from the Joint Office for Logistics Technology (JOLT) and (2) target technology insertion following mid-term and long-term strategic issues identified in the USTRANSCOM FY2001 Strategic Guidance Document.

In the first method, JDSTs collect, categorize, and depict data elements in an easy to use and understand format for decision-makers at all levels of command and throughout the logistics pipeline. AT2000 qualifies as a JDST and is geared toward planners who need accurate, real-time data to plan collaboratively, prioritize, and redirect logistics operations. These tools will improve Course of Action (COA) analysis/mode determination, monitoring of execution, and dynamic reaction planning when execution deviates from planning assumptions.

JOLT has four primary objectives that assist AT2000 in achieving its third goal: 1) ensure joint tools support all of the Services, Agencies, and warfighting CINCs; 2) provide close linkage to DARPA and their initiatives, such as the Advanced Logistics Program (ALP); 3) develop joint tools within the Global Combat Support System (GCSS) environment; and 4) continue to support existing joint decision tools already deployed in theaters of operation until Phase II of the ACTD is operational. The third JOLT objective represents a tremendous challenge to AT2000. In order for AT2000 to remain viable, it must comply with the GCSS vision: 1. any box, 2. any user, 3. one net, 4. one picture, 5. common services, and 6. robust communications infrastructure.

To become a GCSS compliant, AT 2000 must overcome challenges in data security, system infrastructure, and data sharing. (JCS 1994) Authentication of users, protection from hackers, and protected connections between classification levels are only a few of the pressing issues. Security alternatives such as Guard, Fortezza Card and Firewall technologies are being developed to prevent unauthorized access.

Regarding infrastructure, the Defense Information System Agency (DISA) is responsible for long-haul communications, while Services, Agencies, and CINCs are responsible for installation and deployed communications. As GCSS evolves to meet expanding information requirements, robust communications must be available to support the intranet load. DISA has already made significant increases in long-haul bandwidth. Installation and deployed communications must remain a Service, CINC, and Agency priority to ensure vertical and horizontal connectivity.

Finally, data sharing is the linchpin in today's environment of widely disparate databases previously created. Achieving one picture is a formidable task. A shared data environment is an essential component of DISA's overall technical strategy for GCSS. Also, common approaches to sharing data such as the Air Force’s Global Data Management System (GDMS) are already being used with plans to expand as development progresses.

The second method AT2000 managers will use to achieve AT2000’s third objective (establish a process to transition emerging technology to ensure continuing improvement of DTS) is to follow the mid-term and long-term strategic issues identified in the USTRANSCOM FY2001 Strategic Guidance Document. These issues include modeling and simulation; C2 of DTS operations; transportation research and development (R&D); the Joint Deployment Process; DTS Enterprise Architecture; and DTS migration system strategy. (Seaman 2001)

The modeling and simulation issue stems from USTRANSCOM's lack of an integrated, analytical tool to perform responsive, flexible and accurate end-to-end DTS analysis in support of CINC Course of Action (COA) development. If AT2000 can obtain this capability, then its mode determination/optimization tools will provide greater flexibility in planning and executing deployments/redeployments to ensure best use of lift assets while maximizing the operational effectiveness of the deploying forces.

Another key issue from the Strategic Guidance Document is the Joint Deployment Process. As USTRANSCOM streamlines the Joint Deployment Process, it becomes the leader in preparing JDSTs such as AT2000. If the unified commands and USTRANSCOM can plan a contingency deployment through a common operating picture that provides TAV and flexible mode scheduling (AT2000), then USTRANSCOM may be able to lead the time-phased force deployment data (TPFDD) development transformation.

The final strategic issue identified in the USTRANSCOM FY2001 Strategic Guidance Document is the DTS migration system strategy. USTRANSCOM points to the numerous redundant and technologically outdated systems (DAMMS-R, GCSS-A, TC-AIMS, etc.) that cause resource inefficiencies in the DTS. These systems have individual significance, but they are collectively useless. The Army's Chief of the Transportation Corps, BG Dail, believes the "key to long-term value of movements control units is the authorization and use of state of the art movements information systems which integrate joint and service fed data". (Dail 2001) AT2000 boasts this future capability, but BG Dail is looking to TC-AIMS II to meet this requirement since the current GCSS-A does not meet the need. AT2000 managers will either create a redundant system or eliminate the need for TC-AIMS altogether.

Benefits/Disadvantages

Disadvantages - AT2000 managers hope to create solutions for the USTRANSCOM FY01 Strategic Guidance Document issues while establishing itself as a real-time TAV/mode optimization tool. Because neither the system nor the future "solutions" are available for analysis, the obvious drawback is that AT2000 is only a concept and cannot be tested. No analysis can be conducted on a system that is still being created. AT2000 must achieve significant milestones in the GCSS environment if it is going to survive the acquisition life cycle, but if it does, it will be of its connection with the JOLT and its ability to harness emerging technology that is succeeding in the commercial sector.

Chapter 6

CONCLUSION

AT2000 proponents pursue objectives that can greatly assist or hinder the supply chain initiatives in the DOD. If AT2000 is not delayed in the acquisition process and becomes a viable C2 system for mobility managers, then it presents the ability to decrease CWT. AT2000 will decrease CWT by increasing node throughput, maximizing use of efficient and available transportation, and providing a mobility model capable of analyzing TPFDD flow while in the planning stage of a deployment. The first two capabilities directly improve Velocity Management and the Strategic Management Distribution Initiative; however, if AT2000's capability becomes slowed in a lengthy acquisition life cycle, then the result will be anything but emerging and flexible and will not increase the speed of the distribution pipeline. AT2000's success also requires TAV for materiel and for transportation resources (land, air, and sea). If TAV is not obtained, the JMCG at USTRANSCOM cannot make the DTS more flexible, nor can it optimize the nodes used for deployment/sustainment.

AT2000 must surpass competing C2 logistics systems (TC-AIMS II, GCSS, and ALP) to become the DoD's "single logistics systems". If USTRANSCOM pulls support for AT2000, AT2000 will never leave ACTD status and will not enter full production. If AT2000 does achieve initial operating capability (IOC), it will have procedures in place to improve continually the DTS with new technologies that provide additional flexibility.

Chapter 7

RECOMMENDATIONS FOR FURTHER STUDY

1. While receiving a command brief from Southern Command, the Director of Logistics stated that they relied on USTRANSCOM's Single Mobility System (SMS) to track movements in their area of operations. What is this system and where has it been? Is it a contender with AT2000? Which system is more appropriate for the DTS?

2. Why is TAV so hard to achieve in the US? Why are we not resourcing all SPOEs with RFID interrogators to provide ITV? TAV is not achievable without accurate ITV.

3. Where is TC-AIMS II in the acquisition process? TC-AIMS II proponents have been touting its capability for years, but it has not been implemented in any theater.

4. Why is OSD allowing the Services to continue to create more stove-piped mobility C2 systems? Are there other redundant efforts similar to USTRANSCOM's ALP and AT2000 being developed on the Joint Staff and DLA? When will the joint C2 logistics system contract be awarded?

Table 1

Army Logistics Paradigm Shift (RAND 2001)

Aspects of Army Logistics	**Traditional Paradigm**	**New Paradigm**
Definition of Logistics	Piles of "things"	Set of processes delivering products and services
View of the logistics system	Provider view, by function: • Transportation • Ordnance • Quartermaster	Customer view, by process: • Order fulfillment • Repair • Inventory management • Financial management
Metrics	Days of supply	Time, quality, cost
Reporting	Average performance	Median performance and variance
Management focus	Compliance Budget execution	Customer satisfaction Performance improvement

Table 2

Define-Measure-Improve Methodology (RAND 2001)

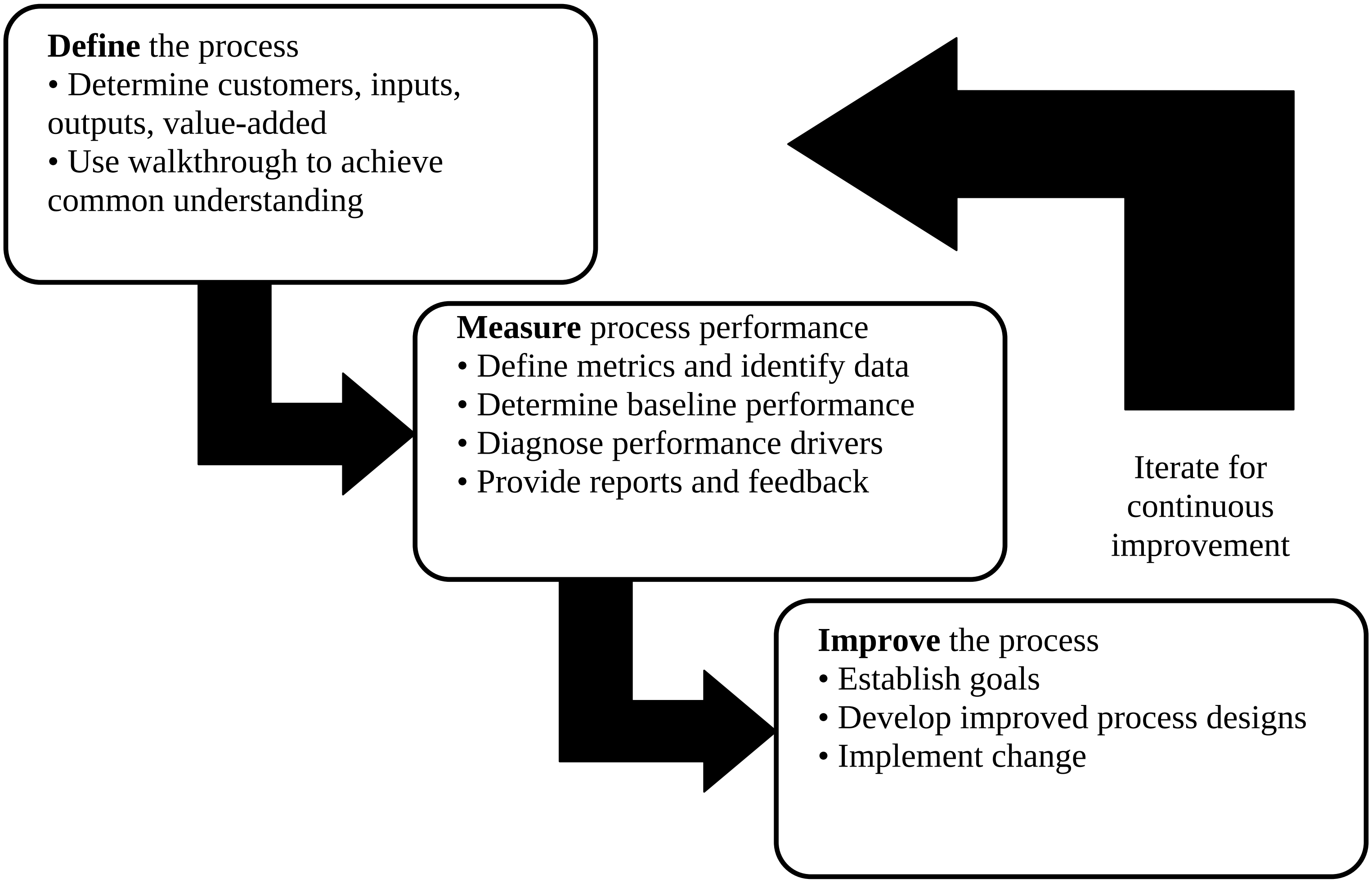


Table 3

Benefits of VM Initiatives (RAND 2001)

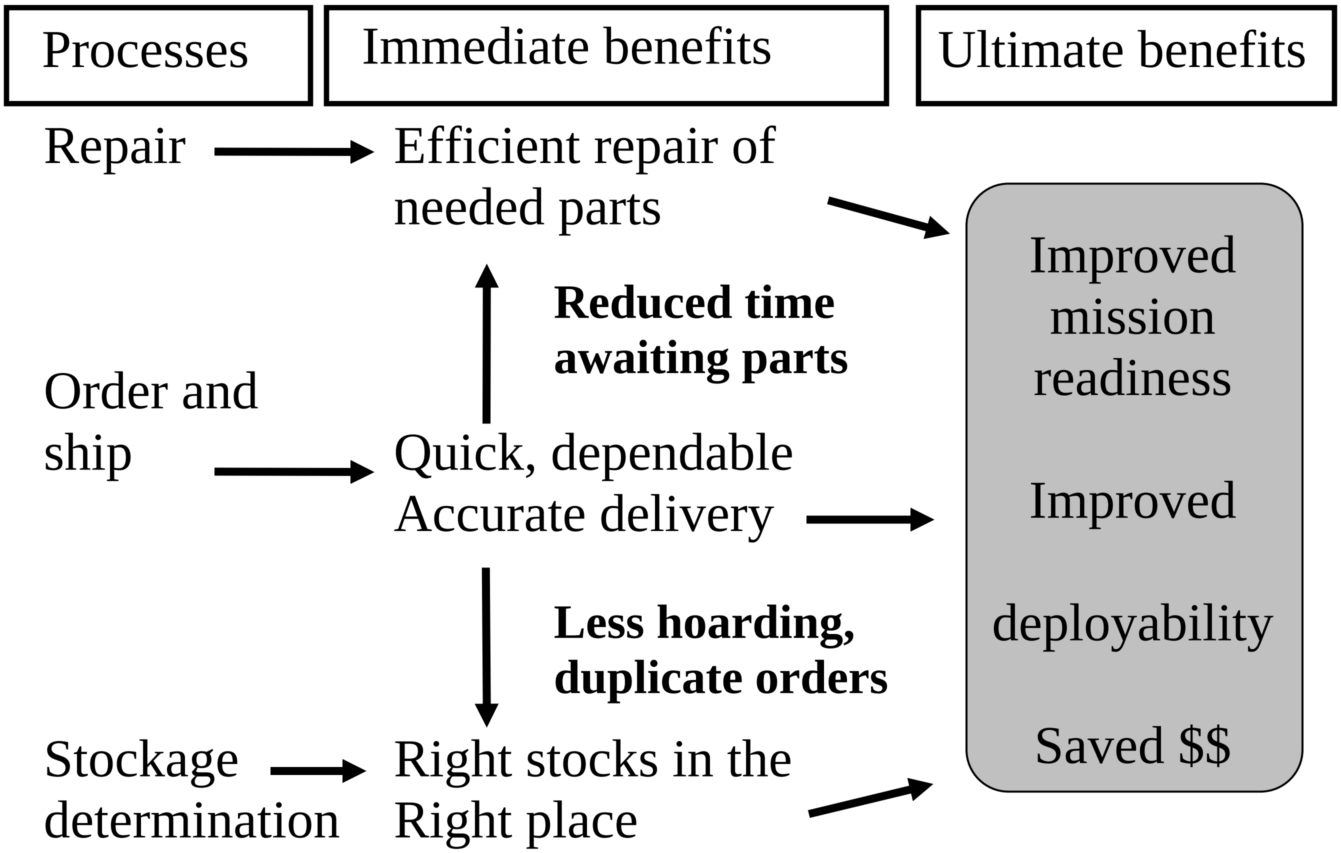


Table 4

GTN Feeder Systems (HERBB 2002)

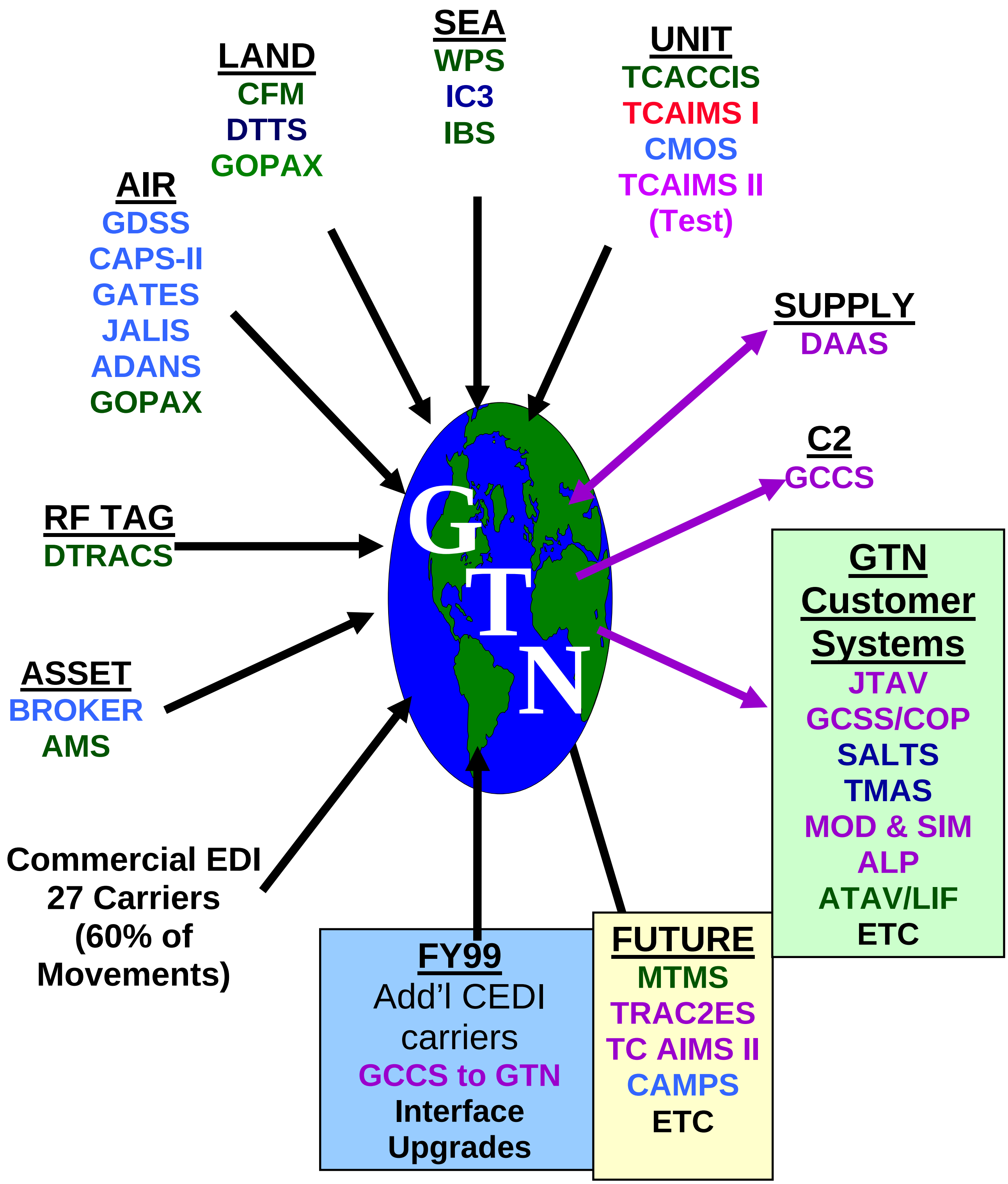
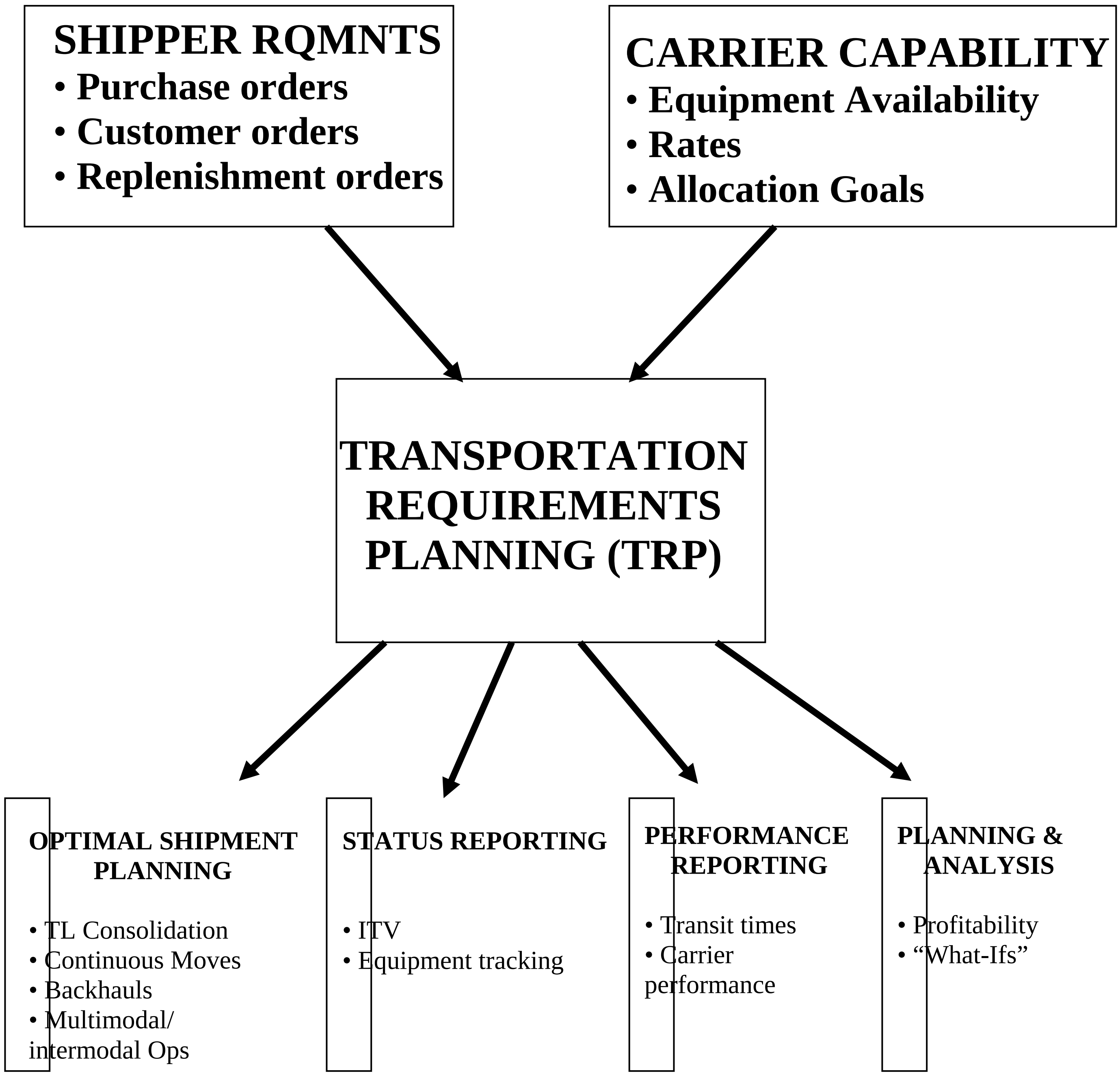


Table 5

Transportation Requirements Planning Model (Stock 2001)



GLOSSARY

3PL	Third Party Logistics
ABC	Activity Based Costing
ABM	Activity Based Management
ACC	Air Combat Command
ACO	Airspace Coordination Order
ACTD	Advanced Concept Technology Demonstration
ADANS	AMC Deployment Analysis System
AFDD	Air Force Doctrine Document
AFFOR	Air Force Forces
AFMC	Air Force Material Command
AFMIS	Army Food Management Information System
AFRL	Air Force Research Laboratory
AIS	Automated Information System
AIT	Automatic Identification Technology
AITS-JPO	Advanced Information Technology Services Joint Program Office
ALM	Air Load Module
ALP	Advanced Logistics Project
AMC	Air Mobility Command
AMDF	Army Master Data File
AMMP	Air Mobility Master Plan
AMOG	Air Mobility Operations Group
AMS	Asset Management System
AMS	Automated Manifest System
ANSI	American National Standards Institute
AOR	Area Of Responsibility
APOD	Aerial Port of Debarkation
APOE	Air Port Of Embarkation
ASC	American Standards Code
ASC II	American Standards Code II
ASF	Aeromedical Staging Facility
ASL	Authorized Stockage List
ASN	Advanced Shipping Notice
AT	Agile Transportation
AT2000	Agile Transportation for the 21st Century
ATCMD	Advanced Transportation Control and Movement Document
BCAT	Base Capability Analysis Tool
C2	Command and Control
C2IPS	Command and Control Information Processing System
C4ISR	Command, Control, Communication, Computer, Intelligence, Surveillance, and Reconnaissance
CAMPS	Consolidated Air Mobility Planning System
CANTRACS	Canadian Transportation Automated Control System
CAPS II	Consolidated Aerial Port Subsystem II
CBL	Commercial Bill of Lading
CCP	Container Consolidation Point
CDDS	CINC Decision Support System

CEDI	Commercial Electronic Data Interchange
CFM	CONUS Freight Management
CHCS	Composite Health Care System
CIM	Corporate Information Management
CINC	Commander in Chief
CMOS	Cargo Movement Operations System
COA	Course of Action
CONOPS	Concept of Operations
CONUS	Continental United States
COE	Common Operational Environment
COP	Common Operational Picture
COTS	Commercial Off-The-Shelf
CRP	Central Receiving Point
CSS	Combat Service Support
CWT	Customer Wait Time
DAAS	Defense Automatic Addressing System
DAMMS-R	Department of the Army Movements Management System - Redesigned
DARPA	Defense Advanced Research and Projects Agency
DASP-E	Department of Army Standard Port System -Enhanced
DBL	Distribution Based Logistics
DBOF	Defense Business Operating Fund
DCB	Dollar Cost Banding
DFAR	Defense Federal Acquisition Regulation
DFAS-IN	Defense Finance and Accounting Service- Indianapolis
DHCP	Defense Health Care Program
DIRMOBFOR	Director of Mobility Forces
DISA	Defense Information System Agency
DLA	Defense Logistics Agency
D-M-I	Define-Measure-Improve
DoD	Department of Defense
DODAAC	Department of Defense Activity Address Code
DOS	Days of Supply
DPSC	Defense Personnel Support Center
DS4	Direct Support Unit Standard Supply System
DSO	Days Sales Outstanding
DSS	Distribution Standard System
DST	Decision Support Tool
DTEDI	Defense Transportation Electronic Data Interchange
DTR	Defense Transportation Regulation
DTRS	Defense Transportation Payment System
DTS	Defense Transportation System
DTS EA	Defense Transportation System Enterprise Architecture
DTS OA	Defense Transportation System Operational Architecture
DTTS	Defense Transportation Tracking System
DUSD(L)	Deputy Under Secretary of Defense for Logistics
DVD	Director Vendor Delivery
EDA	Equipment Downtime Analyzer
EDI	Electronic Data Interchange

EDIFACT	Electronic Data Interchange for Administration, Commerce, and Transportation
EEC	European Economic Community
EFT	Electronic Funds Transfer
ELIST	Enhanced Logistics Intra-Theater Support Tool
EMCON	Emery Control
EOQ	Economic Order Quantity
ERO	Equipment Repair Order
FACTS	Financial Air Clearance Transportation System
FAR	Federal Acquisition Regulation
FIPS	Federal Information Processing Board Publications
GAO	General Accounting Office
GATES	Global Air Transportation Execution System
GBL	Government Bill of Lading
GCCS	Global Command and Control System
GCCS-A	Global Command and Control System - Army
GCSS	Global Combat Support System
GDMS	Global Data Management System
GDSS	Global Decision Support System
GDSS-MLS	Global Decision Support System - Multi-level Security
GO81	AMC Maintenance System for C-5, C-9, C-141, KC-135, and C-17 Aircraft
GOPAX	Group Operational Passenger System
GOTS	Government Off-The-Shelf
GSA	General Services Administration
GT	Guaranteed Traffic
GTN	Global Transportation Network
GUI	Graphical User Interface
HCI	Human Computer Interface
HHR	Hand Held Reader
HHT	Hand Held Terminal
HOST	Headquarters On-Line System for Transportation
HQ AMC	Headquarters Air Mobility Command
HQ USAF	Headquarters United states Air Force
I2P	Standard Transportation Industry Information Processor
IBS	Integrated Booking System
IC3	Integrated Command, Control, and Communications System
ICAO	International Civil Aviation Organization
ICODES	Integrated Computerized Deployment System
ICP	Inventory Control Point
IDHS	Intelligence Data Handling System
ISM	Integrated Sustainment Maintenance
ISR	Intelligence, Surveillance, and Reconnaissance
ITO	Installation Transportation Officer
ITV	In Transit Visibility
ITV MOD	In-transit Visibility Modernization
JALIS	Joint Air Logistics Information Support System
JBI	Joint Battlespace Infosphere
JCS	Joint Chiefs of Staff
JEFX	Joint Expeditionary Forces Exercise

JFACC	Joint Force Air Component Commander
JMCG	Joint Mobility Control Group
JOPES	Joint Operations Planning and Execution System
JTCC	Joint Transportation Corporate Information Management Center
JWID	Joint Warrior Interoperability Demonstration
LIA	Logistics Integration Agency
LIF	Logistics Information File
LOGAIS	Logistics Automated Information System
LOGSA	Logistics Support Agency
LRT	Logistics Response Time
LTL	Less-than-truckload
MASF	Mobile Aeromedical Staging Facility
MC	Mission Capable
MCC	Mobility Control Center
MDSS II	MAGTF Deployment Support System II
METS II	Mechanized Export Traffic System II
MILSTAMP	Military Standard Transportation and Movement Procedures
MIL-STD	Military Standard
MOBCON	Mobilization Control
MOE	Measures of Effectiveness
MRO	Material Release Order
MSC	Military Sealift Command
MTM	Management Reform Memorandum
MTMC	Military Traffic Management Command
MTMS	Munitions Transportation Management System
MTW	Major Theater War
NAOMIS	Navy Material Transportation Office Operations and Management System
NCA	National Command Authority
NDTA	National Defense Transportation Association
NMC	Not Mission Capable
NMCS	Not Mission Capable Supply
NSN	National Stock Number
OPLAN	Operational Plan
OPTEMPO	Operations Tempo
OSA	Operational Support Aircraft
OSC	Objective Supply Capability
OSD	Office of the Secretary of Defense
OST	Order Ship Time
PMR	Patient Movement Request
PMRC	Patient Movement Requirements Center
PIT	Process Improvement Team
POD	Port of Debarkation
POE	Port of Embarkation
POMCUS	Prepositioning of Materiel Configured to Unit Sets
PPTMR	Personal Property Traffic Management Regulation

PRAMS	Passenger Reservation and Manifesting System
PTIE	Phased Technology Insertion and Evaluation
RCT	Repair Cycle Time
RF	Radio Frequency
RFDC	Radio Frequency Data Communication
RFID	Radio Frequency Identification
RGATES	Remote Global Air Transportation Execution System
ROP	Re-order Point
RSO&I	Reception, Staging, Onward Movement, and Integration
RUC	Reporting Unit Code
SAAM	Special Assignment Airlift Mission
SAILS	Standard Army Intermediate Level Supply System
SATP	Strategic Air Transportation Plan
SCC	Small Scale Contingencies
SCOR	Supply-Chain Operations Refence
SDMI	Strategic Distribution Management Initiative
SDMI-E	Strategic Distribution Management Initiative-Europe
SIT	Site Improvement Team
SKU	Stock-keeping Unit
SLS	Single Logistics System
SPOD	Sea Port Of Debarkation
SPOE	Sea Port Of Embarkation
SPVI	Subsistence Prime Vendor Interpreter
STACCS	Standard Theater Army Command and Control System
STAMIS	Standard Army Management Information System
STS	Satellite Tracking System
TACOM	Tank-Automotive and Armaments Command
TAMIS	Tanker Airlift Mobility Integration System
TATP	Theater Air Transportation Plan
TAV	Total Asset Visibility
TBMCS	Theater Battle Management Core System
TC ACCIS	Transportation Coordinator's Automated Command and Control Information System
TC-AIMS	Transportation Coordinator’s Automated Information for Movement System
TC-AIMS II	Transportation Coordinator’s Automated Information for Movement System II
TCC	Transportation Component Commander
TCMD	Transportation Command and Movement Document
TCN	Transportation Control Number
TD-ATD	Total Distribution - Advanced Technology Demonstration
TERMS	Terminal Management System
TIAH +	TPFDD In An Hour Enhanced
TIE	Technology Integration Experiment
TMO	Traffic Management Office
TO	Transportation Officer
TOPS	Transportation Operational Personal Property Standard System

TPFDD	Time-Phased Force Deployment Data
TRAC2ES	USTRANSCOM Regulating and Command & Control Evacuation System
TRP	Transportation Requirements Planning
TUFMIS	Tactical Unit Financial Management Information System
UPC	Universal product Code
UPS	United Parcel Service
USA	United States Army
USD(AT&L)	Under Secretary of Defense B28for Acquisition, Technology and Logistics
USAF	United States Air Force
USA-NG	United States Army National Guard
USCINCTRANS	Commander in Chief, USTRANSCOM
USN	United States Navy
USSTRATCOM	United States Strategic Command
USTC	United States Transportation Command
USTRANSCOM	United States Transportation Command
VDB	Virtual Database
VEDI	Vendor Electronic Data Interchange
VG	Velocity Group
WIP	Work-In-Process
WOLF	Work Order Logistics File
WPS	Worldwide Port System
WWMCCS	Worldwide Military Command and Control System

BIBLIOGRAPHY

AITS-JPO (2001). CINC 21, Defense Information Systems Agency (DISA). **2001**.

Bellhawk (2002). Barcode Primer, Bellhawk. **2002**.

Cottrill, K. (2001). "Winning Strategies (Military Supply Chain Management)." Traffic World **265**(25): 11.

Coyle, J. J. B., Edward J. ; Novack, Robert A. (2000). Transportation. Cincinnati, South-Western College.

Dail, R. T. (2001). Chief of Transportation (COT) Trans Update. D. W. E.-m. K. L. R. W. E.-m. M. (E-mail). Fort Eustis, Dail, Robert T.

DCSLOG, H. (2000). Army Strategic Logistics Plan. Washington D.C., U.S. Army**:** 12, 35.

DLA (2001). Defense Logistics Agency AIT Implementation Plan. Fort Belvoir, DLA**:** 52.

DLA (2001). DLA AIT Implementation Plan.

DoD (2001). Quadrennial Defense Review. Washington D.C., Department of Defense**:** 71.

DSB/USD(A&T) (1996). Report of the Defense Science Board Task Force on Strategic Mobility. Washington D.C., DoD**:** iii.

DSCLOG, A. (2000). Army Strategic Logistics Plan. Pentagon City, U.S. Army**:** 39.

Dumond, J. (2001). Velocity Management: The Business Paradigm that has Transformed U.S. Army Logistics. Santa Monica, RAND.

DUSD(AS&C) (2001). Advanced Concepts in Technology Demonstrations, DUSD. **2001**.

E. C. Aldridge, J. (2001). Introduction to ACTDs, Under Secretary for Acquisition, Technology and Logistics. **2001**.

Editor, A. (1997). "Velocity Management Meets Precision Logistics." Army Logistician(Nov/Dec 1997): 44.

Editor, A. (1998). Prime vendor: Velocity management at DLA. Army Logistician**:** 4.

Emmelhainz, M. A. (1990). Electronic Data Interchange: A Total Managment Guide. New York, Van Nostrand Reinhold.

Greaves, M. (2001). Advanced Logistics Project, DARPA. **2001**.

Grothe, G. K. (2001). "SDMI-E In-transit Visibility (ITV) Terrain Walks." 15.

Harvey, A. C. (2001). The Road to Focused Logistics. U.S. Army War College. Carlisle Barracks, U.S. Army War College**:** 18.

Heath, A. (2002). "Global Transportation Then and Now." Defense Transportation Journal **2002**(February): 14.

HERBB (2002). The Global Transportation Network, HERBB. **2002**.

House, T. W. (1999). A National Security Strategy For a New Century, White House**:** 62.

JCS (1994). Focused Logistics - A Joint Logistics Roadmap, Pentagon**:** 44.

JCS (1995). Joint Vision 2010 Focused Logistics.

JCS (2000). Joint Vision 2020.

Keane, G. J. M. (2000). DoD Reform Initiative Directive (DRID) #54 - Logistics Transformation Plans. D. S. o. Defense. Washington D.C., Army Staff. **2001**.

Kucyk, D. P. (1997). Velocity Management-Ahead of its Time at TACOM. Army Logistician. **Sep/Oct 1997**.
Lowe, D. (2001). CAC IPT Update, DLA. **2002**.
Mason, L. G. (2001). Joint Logistics Advanced Concept Technology Demonstration, DARPA. **2001**.
Mason, L. G. (2001). Joint Theater Logistics Advanced Concept Technology Demonstration (ACTD), DARPA. **2001**.
Miracle, W. B. (1999). Just-In-Time Efects on Peacetime Efficiency and Wartime Readiness. Command And General Staff Course. Fort Leavenworth, Army Command And General Staff College**:** 63.
MTMC (2001). "MTMC-Industry works on faster ocean shipments." TRANSLOG(September/October 2001): 10-11.
Pagonis, W. G. (1992). Moving Mountains. Boston, Harvard Business School Press.
Penske (2002). About Big Lots, Penske Logistics. **2002**.
Penske (2002). About Wawa, Penske Logistics. **2002**.
RAND (2001). Velocity Management The Business Paradigm That Has Transformed U.S. Army Logistics. Santa Monica, RAND.
Richmond, B. B., Ann; Mabe, Jay; Nuthall, Linda; and Toole, Rick (1998). Supply Chain Management Tools. Strategic Supply Chain Alignment. J. L. Gattorna. Hampshire, England, Gower**:** 512 - 513.
Seaman, K. (2001). Agile Transportation for the 21st Century
(AT2000) - An FY02 ACTD PROPOSAL, USTRANSCOM J5-SC Concepts and Technology Team**:** 7.
Service, U. N. (2001). Strategic Distribution Management Initiative under way.
Service, U. N. (2002). SDMI achieves record cut in customer wait time, USTRANSCOM. **2002**.
Shafritz, J. M. O., Steven J. (2001). Classics of Organizational Theory. Orlando, Harcourt, Inc.
SSC (2000). Supply-Chain Operations Reference-model. Pittsburgh, Supply-Chain Council**:** 21.
Staff, J. C. o. (2000). "Joint Vision 2020." 24.
Stock, J. R. L., Douglas M. (2001). Strategic Logistics Management. New York, McGraw-Hill.
Team, V. (2000). "Commercial "Pipeline Tracker" (PT-E2)." Velocity Management Newsletter **1**(2): 1-2.
USDOT, N. (1994). Intransit Visibility: Harmonizing the Process. Cambridge, US Department of Transportation**:** 75.
USTRANSCOM (1991). USTRANSCOM Regulation 4-5 Information Management - Data Management and Standards Program. Scott Air Base, USTRANSCOM.
USTRANSCOM (2000). Defense In-transit Visibility Integration Plan. Scott Air Force Base, USTRANSCOM**:** 50.
USTRANSCOM (2000). USTRANSCOM Handbook 24-2 Understanding the Defense Transportation System. Scott Air Force Base, USTRANSCOM.
USTRANSCOM (2001). "Strategic Distribution Management Initiative under way."
USTRANSCOM (2001). USTRANSCOM Strategic Guidance. Scott Air Force Base, USTRANSCOM**:** 5,12.

Walden, J. L. (1999). "A Velocity Management Update." Army Logistician **March/April 1999**(March/April 1999): 5 - 7.

Walden, J. L. E., C.W. Jr. (1997). "Velocity Management at the NTC." Army Logistician **March/April 1997**(March/April 1997).

Wolford, D. A. (1996). Improved Visibility Within the Air Force ITV System. Graduate in Management Operations. Dayton, Air Force Institute of Technology**:** 60.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

1. REPORT DATE *(DD-MM-YYYY)*: 28 - 06 - 2002

2. REPORT TYPE: Graduate Research Project

3. DATES COVERED *(From - To)*: Jun 2001 - Jun 2002

4. TITLE AND SUBTITLE

Agile Transportation For the 21st Century (AT2000) Objectives for the DTS

Are the Objectives of AT2000 inline with VM and SDMI?

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

6. AUTHOR(S)

Eungard, Brad, J., Captain, U.S. Army

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Air Force Institute of Technology
Graduate School of Engineering and
Management (AFIT/EN)
2950 P Street, Building 640
WPAFB OH 45433-7765

8. PERFORMING ORGANIZATION REPORT NUMBER

AFIT/GMO/ENS/02E-04

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Mr. Keith Seaman (GS-15)
USTRANSCOM J5-SC Concepts and
Technology Team
Scott Air Force Base
DSN 779-1109

10. SPONSOR/MONITOR'S ACRONYM(S)

USTRANSCOM J5-SC

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release, distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The Department of Defense (DoD) recognizes the benefits of in-transit visibility of commodities throughout the Defense Transportation System (DTS). The United States Transportation Command (USTRANSCOM) created the Global Transportation Network (GTN) as the primary command and control (C2) tool to capture and utilize in-transit cargo data. USTRANSCOM J5 is developing an advanced concept in technology demonstration (ACTD) called Agile Transportation for the 21st Century (AT2000) to improve C2 of cargo in-transit anywhere in the DTS.

While developing AT2000, USTRANSCOM continues to focus on supply-chain management as part of a revolution in military logistics (RML). The United States Army's Velocity Management and USTRANSCOM's Strategic Distribution Management Initiative (SDMI) are key supply-chain initiatives in RML. Will the objectives of AT2000 improve or hinder these supply-chain initiatives? This question will provide the impetus for this research paper.

15. SUBJECT TERMS

Agile Transportation for the 21st Century, Velocity Management, Strategic Distribution Management Initiative, Total Asset Visibility

16. SECURITY CLASSIFICATION OF: a. REPORT	b. ABSTRACT	c. THIS PAGE	17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
U	U	U	UU	79	LtCol Stephan P. Brady
					19b. TELEPHONE NUMBER *(include area code)* (937) 255-6565 x4367