INTRANSIT VISIBILITY: CAPTURING ALL THE SOURCE DATA

Graduate Research Paper

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AFIT/GMO/LAP/96J-5

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GRADUATE RESEARCH PAPER

Presented to the Faculty of the School of Logistics and

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Master of Air Mobility

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Jim Miller

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Abstract

Visibility of assets within the Defense Transportation System has always been a challenge for the Department of Defense (DoD). The United States Transportation Command (USTRANSCOM) is DoD's lead agency for establishing Intransit Visibility. In its effort to establish Intransit Visibility, USTRANSCOM developed the Global Transportation Network, which acts as a central repository for transportation information. This will enable USTRANSCOM to collect information about cargo and passengers at their points of origin, and to track their movement through each node of the transportation network. In order to simplify the communication process within the network, USTRANSCOM has initiated several improvements: a reduction in the number of computer systems that process transportation information; data standardization to promote compatibility between these systems; simplification of the Defense Transportation Regulation; and standardization of Electronic Data Interchange transaction sets. These modifications will ease the difficulty of obtaining visibility information and facilitate the development of the Global Transportation Network.

INTRANSIT VISIBILITY:

CAPTURING ALL THE SOURCE DATA

I. Overview

Introduction

Keeping track of assets and personnel in the Defense Transportation System (DTS) has challenged the Department of Defense (DoD) for many years. Rising to meet this challenge, many people inside and outside the transportation community formulated conceptual models for tracking assets within the transportation network. The lessons learned from the Gulf War created new interest for tracking DoD assets while intransit. During Desert Shield/Storm, over 20,000 of the 40,000 containers entering the theater were opened to determine the contents (DoD, 1995: 1-1). The problem of tracking assets existed long before the Gulf War but the United States' shift to a force projection strategy focused new attention on Intransit Visibility (ITV) from outside the transportation community (Wykle and Wolfe, 1993: 8). With this increased attention, the United States Transportation Command (USTRANSCOM) named 1994 as "the year of Intransit Visibility" (ITV) and began a major push to solve the DTS visibility problems.

Intransit visibility is defined as "the ability to track the identity, status, and location of DoD unit and non-unit cargo (excluding bulk petroleum, oils, and lubricants); passengers; medical patients; and personal property from origin to the consignee or destination designated by the CINCs, Military Services, or Defense agencies, during peace, contingencies and war" (DoD, 1995: B-1). In other words, ITV is the ability to track assets from origin to destination.

Many conceptual models were built to aid understanding the problem of tracking assets and guide the developmental efforts. ITV will be achieved by capturing the transportation information at its source and updating this information as the assets process through each node of the transportation system. The information will be captured from current and future computer systems (Holevar, 1995). These systems will feed a module of USTRANSCOM's Global Transportation Network (GTN); users with a modem-equipped laptop computer can access GTN to determine the location of assets within the DTS (Rutherford, 1995: 10). Figure 1 illustrates this concept. The computer systems feeding the GTN integrated database are described in Appendix A and many of the acronyms found throughout this paper are listed in Appendix B.

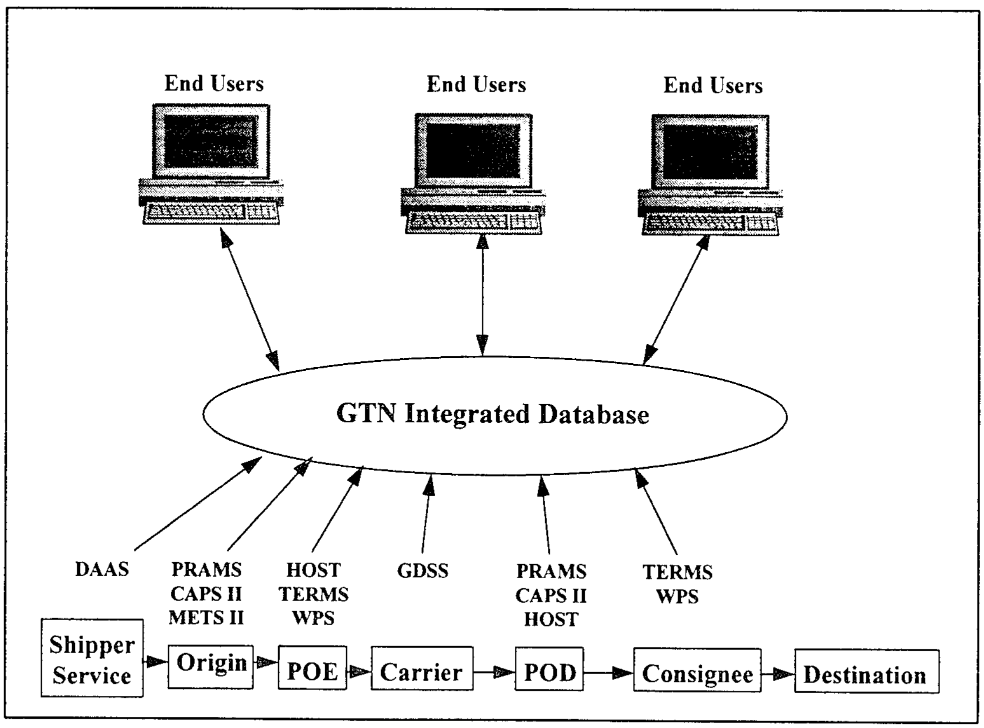

Figure 1: GTN Concept of Operations (DISA Vol. 1, 1995: 14)

Description of Problem

A critical problem with ITV is that the Department of Defense (DoD) is currently unable to electronically capture, convert and distribute all the movement data within the DTS. One reason for this problem is the large number of computer systems currently in use to track movement information. USTRANSCOM's migration strategy will attempt to reduce the number of systems from 120 to around 25 (Rutherford, 1995: 9). Reducing the number of computer systems helps simplify the capturing of ITV data; however, the completed ITV system becomes dependent on the completion of the new systems. For this reason, ITV is being developed in modular fashion as an open system (Wykle and Wolfe, 1993: 10). As new systems are developed, they will be connected to GTN's integrated database.

Another component of the information capturing problem is that not all carriers use electronic information to process their shipments. This lack of electronic information makes it difficult for any ITV system to capture visibility into that segment of the transportation network. Although fragmented information is better than none at all, it falls short of the ITV goals.

Standardization can also lead to simplification of data capture. If the input data is standardized, computer computations are minimized, future connectivity is simplified, and interfaces between component systems become a possibility.

The research in this paper is limited to the data capture element of ITV. In particular, the paper explores the migration strategy, methods of standardizing data, and methods of capturing direct vendor delivery (DVD) information.

Need for Resolution

If the DoD cannot capture all the transportation movement information, it will never achieve complete visibility over its intransit assets. If the DoD is unable to achieve ITV, it is destined to repeat the mistakes of the past. U.S. forces will not receive critical equipment and supplies in a timely manner and the DoD will pay unnecessary demurrage and detention fees (GAO, 1992). Better ITV in peacetime will save money and in wartime will save lives.

Background

ITV is part of a larger system which will attempt to gain visibility of all DoD assets. This larger system, Total Asset Visibility (TAV), is an initiative from the Office of the Secretary of Defense. TAV incorporates three components: In-Process Visibility, Intransit Visibility, and In-Storage Visibility. The Department of Defense (DoD) defines TAV as "the capability of both operational and logistics managers to determine and to act on timely and accurate information about the location, quantity, condition, movement, and status of DoD materiel assets" (Total Asset Visibility Conference, 1994).

Investigative Questions

The following questions form the investigative basis of this research paper:

1. What systems provide transportation information to the ITV module of GTN?
2. How is the input data standardized?
3. How is all the source data captured?
4. Who are the users and how will they access ITV information?

5. Are the users and programmers talking to each other to ensure the correct information is being processed?

Concerns

Since USTRANSCOM's GTN system will be the focal point for all ITV information, GTN deserves a closer look. GTN will incorporate four components. They are 1) ITV, 2) Current Operations, 3) Future Operations, and 4) Patient Movement (DoD, 1995: 1-4). When the priorities are made regarding the importance of each of the modules, the ITV module may not get the attention it needs to ensure adequate visibility.

Another major concern of ITV is how it will integrate with TAV and the other components of TAV. There is a risk of duplicating effort among ITV, In-Process Visibility, and In-Storage Visibility. Also, there is the risk of optimizing the ITV system at the expense of TAV. To ensure this does not happen, DoD must closely supervise these different components of TAV.

Methodology

Understanding the problems of fielding a comprehensive Intransit Visibility system requires a unique vocabulary. Appendix B offers some relief with a list of common acronyms. Appendix A provides a short description of some of the computer systems which are used for processing transportation information. The reader is encouraged to reference these appendices often while reading through these pages.

Since USTRANSCOM is the lead agency for establishing ITV for the Defense Transportation System, the literature review contained in Chapter II summarizes some of the major work performed there. Chapter III highlights the problems introduced in this first chapter with Chapter IV proposing possible courses of action. Finally, Chapter V restates the investigative questions introduced in this chapter and provides answers which draw upon the research contained throughout this paper.

Chapter Summary

The DoD needs a system to keep track of its assets while they are in the transportation network. Intransit Visibility (ITV) is the initiative to provide tracking of assets in the Defense Transportation System (DTS). ITV is accomplished by collecting transportation information from various computer systems and consolidating this information in a database located in USTRANSCOM's Global Transportation Network (GTN). The inability to capture all the transportation information creates holes in the ITV system. Exploring possible methods of capturing all the transportation information is the emphasis of this research.

II. Literature Review

Chapter Overview

This chapter presents a brief evolution of Intransit Visibility as it matured into a module of the Global Transportation Network. Also, this chapter gives a brief history of GTN with a look at the current ITV component systems which provide information to the network. Following this look, the life cycle cost/benefit analysis of GTN is summarized. Then, the chapter furnishes USTRANSCOM's migration strategy for the various transportation computer systems. The chapter concludes with a review of the Defense Transportation Regulation (DTR) restructuring effort.

Establishing a Need for ITV

Visibility of assets is not a new problem. It has troubled military logisticians for hundreds if not thousands of years. Lieutenant General Wykle, former Deputy Commander in Chief (DCINC) of USTRANSCOM, joked that "cargo is sometimes delivered in spite of the system, not because of it" (Wykle, 1993: 8). With the rising costs of component spare parts, the shrinking size of our airlift fleet, and the reductions of depot inventories, ITV is a necessity for an effective logistics system (Gross 1995: 2-4).

A RAND study published in 1994 cites numerous asset visibility problems during the Korean, Vietnam, and Persian Gulf wars as well as the Somalia humanitarian mission (Halliday, 1994: 1). Common themes throughout each conflict were supplies lost in ports, long requisition-to-receipt times, multiple requests for the same part, and poor documentation of inventory and receipts (Halliday, 1994: 2). The study classifies the problems in four general areas including structural issues, user reactions, unresponsiveness to change, and low standards. The authors conclude by offering three recommendations. First, the DoD should study industry distribution models and selectively use or adapt them. Second, the DoD should determine which steps can be eliminated, automated, or combined in its distribution system and identify needed technologies which offer the largest gains. Finally, the DoD needs to establish high standards of performance for each distribution element and measure the performance of each element against the standard (Halliday, 1994: 5). Lorraine and Michno reached a similar conclusion in their thesis and recommended a centralized logistics control facility to minimize the DoD's asset visibility problems (Lorraine and Michno, 1994: 6).

Problems with asset visibility in the defense transportation system have long been recognized but not until recently have they been given a higher priority. The decline in defense budgets over the last 10 years and the change in our national military strategy to force projection from stateside locations make ITV a necessity. However, the single most important event that piqued interest in ITV outside the transportation community was Operation Desert Shield/Storm (Wykle, 1993: 8). This interest induced General Fogleman, former USTRANSCOM CINC, to name 1994 "the year of ITV" (Fogleman, 1993).

Global Transportation Network

The Global Transportation Network is the backbone of ITV. It is designed to "collect, consolidate, and integrate the status and location of military cargo, passengers, patients, and lift assets from multiple DoD and commercial transportation systems"

(Mathews and Holt, 1995: 28). GTN serves as a central repository of transportation information. USTRANSCOM began developing a GTN "proof-of-concept" prototype in 1989 (USTRANSCOM LCC/BA, 1995, 2-1). This prototype focused on answering location and status queries on ammunition shipments, containers, and passenger movements by *pulling* information from existing data bases (DoD, 1995: 1-4). As expanded queries were tested, this pull system became highly communications-intensive and was abandoned for a *push* system. Now with version 2.3, participating systems push information to an integrated database, which allows GTN to support a larger customer base without significantly increasing the interactive user-load on the supporting systems (DoD, 1995: 1-4).

Currently, eight participating systems push information to GTN's integrated database (see Figure 2). The Air Mobility Command (AMC) owns four of these systems including the Passenger Reservation and Manifesting System (PRAMS), the Consolidated Aerial Port System II (CAPS II), the Headquarters On-line System for Transportation (HOST) and the Global Decision Support System (GDSS). PRAMS "records non-unit passenger reservations, issues boarding passes, and generates the aircraft manifest for fixed aerial ports of embarkation (APOE)" (DoD, 1995: A-8). PRAMS updates GTN every two hours (Isack, 1995). CAPS II is used at aerial ports to carry out local cargo, mail, and passenger processing functions, and updates GTN continuously (DISA Vol 1, 1995: 22). HOST is comprised of six subsystems and contains airlift cargo data, worldwide manifest data, and air shipment information (DoD, 1995: A-6). HOST will pass GTN contingency aircraft cargo data on a continuous basis

(DISA Vol 1, 1995: 24). GDSS is a command and control system used for planning and execution of airlift missions; GDSS sends updates to GTN after every transaction (Isack, 1995).

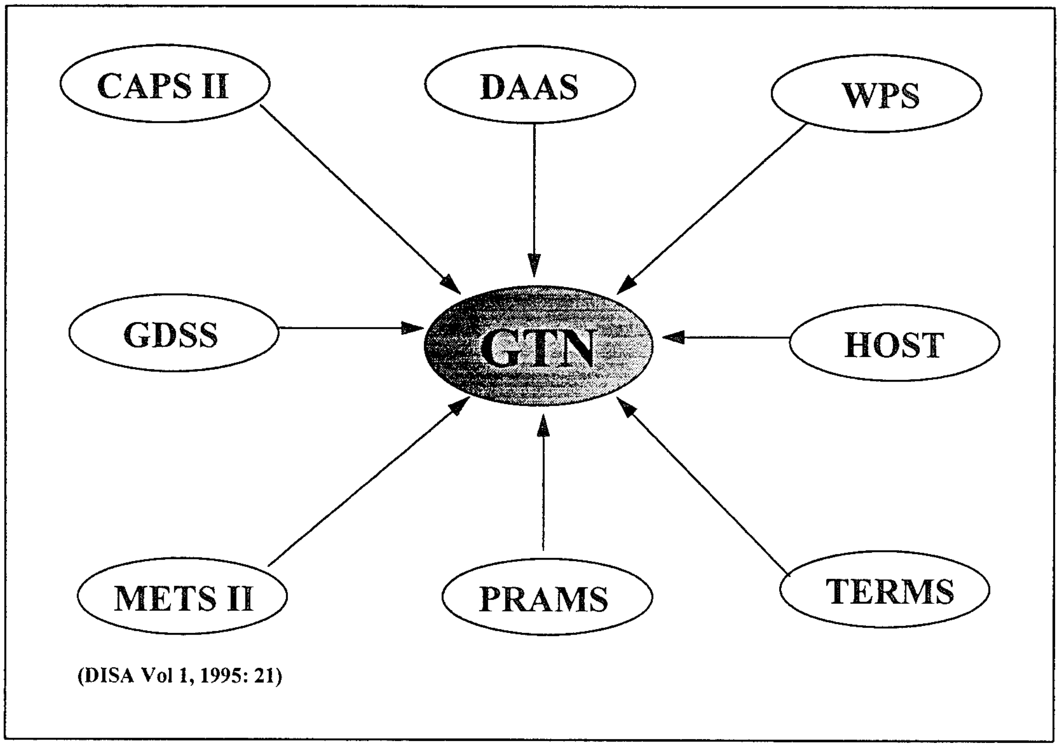

Figure 2: Current GTN System Interfaces

The Military Traffic Management Command (MTMC), the Army component command of USTRANSCOM, owns three systems which push information to GTN's integrated data base. These systems include the Military Export Traffic System II (METS II), the Terminal Management on-line System (TERMS), and the Worldwide Port System (WPS). METS II provides GTN with unit cargo booked for ocean shipment on a daily basis (DISA Vol. 1, 1995: 22). TERMS also updates GTN on a daily basis with "cargo at port awaiting sea shipment, cargo loaded on and off ships, ship sailings, and cargo that has departed from a port" (DISA Vol. 1, 1995: 22). WPS, the final MTMC system, is a migration system which will replace TERMS; it updates GTN every six hours (Isack, 1995).

The Defense Logistics Agency (DLA) owns the Defense Automatic Addressing System (DAAS) which provides GTN with requisition, shipping, and receipt information. DAAS updates GTN every hour or when one megabyte of data is stored at the DAAS site (Isack, 1995). This information is summarized in Table 1.

Table 1: GTN Component System Updates (Isack, 1995)

AMC Systems:	**Updates to GTN:**
PRAMS	Every two hours
CAPS II	Continuously
GDSS	Every transaction
HOST	Continuously
MTMC Systems:	
METS II	Once a day
TERMS	Once a day
WPS	Every six hours
DLA System:	
DAAS	Hourly or when 1MB of data is stored

The initial operational capability (IOC) for the production version of GTN is projected for February 1997 (Young, 1995). The contract was awarded to the LORAL Corporation; its Defense Systems-East Division controls this telecommunication and information system (Zebroski, 1996). LORAL expects to achieve IOC by November of 1996 (LORAL, 1995: 2).

Life Cycle Cost/Benefit Analysis

USTRANSCOM performed the first Life Cycle Cost/Benefit Analysis (LCC/BA) of GTN and produced a draft in September 1993. The Office of the Director (OD)

Program Analysis and Evaluation (PA&E) reviewed this draft and requested a final version which was subsequently produced in January 1995. In this analysis, USTRANSCOM compared the costs and benefits of two different options. The first option, *The Status Quo Alternative,* involved the continuation of the operational prototype (v. 2.3) through fiscal year 2010. The second option, *The Preferred Alternative*, involved the "full development, operations and support [of GTN] through fiscal year 2010 with operational prototype maintenance until delivery of the Preferred Alternative initial operational capability (IOC)" (USTRANSCOM, 1995: 2-2). OD PA&E considered other options infeasible, impractical or unnecessary (USTRANSCOM, 1995: 2-2).

Benefits. The primary benefits of a comprehensive ITV system such as GTN are enhanced warfighting capability and reduced operating costs (DoD, 1995: 4-1). Enhanced warfighting capability is achieved through the "ability to divert and reconstitute shipments, exercise sound traffic management, and ensure personnel and materiel reach their destination in a timely and complete manner" (DoD, 1995: 4-2). An effective ITV system is a force multiplier because it gives the warfighting commanders confidence in their logistical support, allowing them swift and decisive moves (USTRANSCOM LCC/BA, 1995, 2-3).

Reduced operating costs are achieved through improved efficiency in both supply and transportation operations. These efficiencies include knowledge of the total flow of cargo and passengers, the ability to foretell lift requirements with greater precision and accuracy, elimination of uncertainty, and a reduction in the perceived "need" for reordering critical supplies (USTRANSCOM LCC/BA, 1995, 2-3). In Operation Desert Shield/Storm, sustainment supplies were requisitioned multiple times and unit equipment did not always arrive where it was needed because of lack of ITV (Tuttle, 1993: 14). The goal of GTN's ITV module is to eliminate these problems.

Costs. Cost estimations involved a number of assumptions. In the LCC/BA for GTN, constant FY95 dollars were used. A change in the discount rate could impact the dollar figures in the analysis. The analysis also assumed that two major regional conflicts would occur during the service life of GTN. This life is projected from FY97 through FY10. The study used 1999 and 2005 as the major regional conflict years (USTRANSCOM LCC/BA, 1995, 2-4). A greater number of conflicts would add to the benefit margin and a smaller number of conflicts would reduce it.

The Life Cycle Cost/Benefit Analysis study cited a hard cost savings of $1,368 million in the selection of the *Preferred Alternative,* with an additional estimated $193 million in cost avoidance (USTRANSCOM LCC/BA, 1995, 2-5). Expert opinion valued the non-quantifiable benefits of the *Preferred Alternative* at $781 million (USTRANSCOM LCC/BA, 1995, 2-5). The future development and maintenance cost of fielding the *Preferred Alternative* of GTN was estimated at $422 million through FY10 (USTRANSCOM LCC/BA, 1995, 2-5).

In contrast, the *Status Quo Alternative* would cost $66 million through FY2010 and realize an estimated hard cost savings of $294 million (USTRANSCOM LCC/BA, 1995, 2-6). Discounting these figures yields a benefit/cost ratio of 4.39 compared to the *Preferred Alternative* benefit/cost ratio of 3.11. If total prior year costs are factored in the benefit/cost ratio, the figures favor the *Preferred Alternative* with a ratio of 2.67 versus the *Status Quo Alternative* ratio of 2.10 (USTRANSCOM LCC/BA, 1995, 2-6). The break even year for both alternatives is FY99. These results are summarized in Table 2.

Table 2: Life Cycle Cost/Benefit Analysis (USTRANSCOM LCC/BA, 1995: 2-6)

LCC/BA Recap (Actual Dollars) as of: 22 December 1994		
	Constant $K	Discounted $K
Status Quo Alternative		
Total Quantifiable Benefit (cum savings):	294,506	238,903
Total Future Year Costs:	66,515	54,378
Total Prior Year Costs (not discounted):	59,405	59,405
Total Costs (cum):	125,922	113,783
Net Present Value = PV Benefits - PV Costs:		184,525
Benefit/Cost Ratio PV:		4.39
Benefit/Cost Ratio (cum):		2.10
Break Even Year:		FY99
Preferred Alternative		
Total Quantifiable Benefit (cum savings):	1,368,431	1,112,167
Total Future Year Costs:	422,461	357,789
Total Prior Year Costs (not discounted):	59,405	59,405
Total Costs (cum):	481,866	417,194
Net Present Value = PV Benefits - PV Costs:		754,378
Benefit/Cost Ratio PV:		3.11
Benefit/Cost Ratio (cum):		2.67
Break Even Year:		FY99

Migration Strategy

The Joint Transportation Corporate Information Management (CIM) Center (JTCC) was chartered to provide central direction of transportation information systems' development and migration, standardize data within the transportation computer systems, and incorporate functional process improvement techniques (Whitaker, 1996). As part of the JTCC's migration strategy, the JTCC proposed a new baseline to reduce functional redundancy among systems (JTCC, 1996). This will result in fewer individual systems and increased integration (DISA Vol. 1, 1995: 1). The goal is to reduce cost and increase compatibility between transportation information systems.

The migration strategy is a three-phase process which screens each individual transportation system and selects only ones with the most utility (Whitaker, 1996). Phase I was the initial screening of transportation computer systems. During this phase, functional experts were brought together during several sessions over a three-month period to develop questions that would be used to evaluate the various systems. Phase I began in early 1994 and terminated on 31 March 1995.

By 10 May 1994, JTCC identified 120 different systems which processed transportation information (JTCC, 1996). Subsequently in June and early July of 1994, the JTCC found an additional 17 for a total of 137 systems using transportation information (JTCC, 1996). Of these systems, some had their primary function outside of transportation. By 31 March 1995, 23 systems were approved for migration, 65 were eliminated or being eliminated, 14 had their primary function outside of transportation, and 35 were pending action (JTCC, 1996).

Phase II began in November 1995 and will continue through April 1996. During this phase, the functional experts' questions are being re-evaluated and the 35 systems that were pending action from Phase I are being evaluated. Since this is a fluid environment, constant re-evaluation is necessary to ensure the goals are not obscured from the process (Whitaker, 1996). Phase III will be a further evaluation of new systems as they are developed.

To ensure only the best systems survived Phase I of the migration strategy, the process of selecting a computer system was very involved. Usually the surviving migration system incorporated aspects of the legacy systems (Whitaker, 1996). The process began with the JTCC's defense transportation information system baseline and grouped migration candidates in one of nine categories. Each migration candidate was evaluated on the basis of functional coverage, technical merit, and programmatic requirements (DISA, 1995: 5). After evaluation of each candidate, an Integration Decision Paper (IDP) was prepared for each functional category which recommended the migration systems and the lead agency of each system (DISA, 1995: 2). The IDP was then sent to the Office of the Secretary of Defense (OSD) for review and approval. When approved, the lead agency developed a System Decision Paper (SDP). The SDP contained detailed requirements of tasks, responsibility, estimated resources required, and milestones and metrics for the development efforts (DISA, 1995: 2). The SDP was then sent to OSD for approval. Once approved, the lead agency began migration system development and implementation (DISA, 1995: 2). A summary of the nine functional categories, the 23 migration systems, the lead agency, and the source of funding are listed in Table 3. For a description of some of the ITV systems, see Appendix A.

Table 3: Migration Summary (JTCC, 1996)

Category	**Num**	**System**	**Lead Agency**	**Funding**
Unit Move	1	TC-AIMS II (TC-AIMS/MDSS II)	USA	Approved
ITO/TMO		TC-AIMS II (CMOS)	USA	Approved
	2	CFM	MTMC	DBOF
	3	CANTRACS	DLA	Approved
	4	TOPS	MTMC	DBOF/Approved
	5	PRAMS	AMC	DBOF
	6	GOPAX	MTMC	DBOF
Load Planning	7	ALM	MTMC	Approved
	8	ICODES	MTMC	DBOF/Approved
Port Management	9	ITV-MOD (CAPS II)	AMC	DBOF
	10	WPS	MTMC	DBOF/Approved
Financial Mgt		Pending	USTC	DBOF
Mode Clearance	11	NAOMIS	USN	Approved
	12	IBS	MTMC	DBOF
	13	MOBCON	USA NG	Approved
Theater Trans Ops		TC-AIMS II	USA	Approved
	14	C2IPS	AMC	DBOF/Approved
	15	DAMMS-R	USA	Approved
Planning/Execution	16	ADANS	AMC	DBOF
	17	GDSS-MLS	AMC	DBOF
		ITV-MOD (HOST)	AMC	DBOF
		C2IPS	AMC	DBOF/Approved
	18	GTN	USTC	DBOF
	19	ELIST	MTMC	DBOF
	20	AMS (MTMC)	MTMC	DBOF
	21	IC3	MSC	DBOF/Approved
Other	22	JALIS	USN	Approved
	23	DTTS	USN	Approved

Defense Transportation Regulation

On 7 March 1994, the Deputy Under Secretary for Defense delegated responsibility for 38 common user publications to USTRANSCOM (Silvia, 1995). A review of these 38 publications indicated there was much duplication and conflict among them. In partnership with the services, USTRANSCOM component commands and the Office of Assistant Deputy Under Secretary of Defense for Transportation Policy, USTRANSCOM's Transportation Management Division is consolidating the 38 publications into one comprehensive Defense Transportation Regulation (DTR) derived from DoD Directive 4500.9, Transportation and Traffic Management (Rutherford, 1995: 10). This new regulation will standardize transportation operations for the movement of passengers, freight, personal property, and units from origin to destination (Rutherford, 1995: 10).

The concept behind the DTR is to provide a single "shipper level" publication for the Installation Transportation Officers (ITOs) and Traffic Management Offices (TMOs). The goal is to provide only what is needed to perform the task; streamline, simplify, and update procedures; and eliminate duplication and conflicts (Silvia, 1995). The regulation is divided into four sections: Passenger, Cargo, Mobility, and Personal Property (Silvia, 1995). Each section undergoes a four step process on its way to final publication and implementation. The first step involves development workshops where representatives for the ITOs/TMOs, USTRANSCOM's component commands, and the services meet to develop a standard way of conducting business. The second step is draft coordination where a working draft is distributed to all the players for inputs and refinements. It continues in this stage until all parties are satisfied. Step three is the review and approval by the Deputy Under Secretary of Defense for Logistics DUSD(L). After approval, the section proceeds to the fourth step which is issue and implementation (Silvia, 1995).

Currently, two of the four sections are completed. The Passenger section was finished in early August 1995 and the Cargo section was completed in late February 1996. The Mobility section is scheduled to be completed in early April 1996 with the Personal Property section following in July 1996 (Silvia, 1995).

Within the Cargo section there are a few initiatives which relate to the data capture element of ITV. First, the regulation sets forth standard Electronic Data Interchange (EDI) procedures. Second, the regulation establishes manual procedures for Government Bill of Lading (GBL) preparation. Finally, the regulation establishes export release procedures based on containerized and non-containerized cargo (Silvia, 1995). With these initiatives, the source systems will provide the ITV module of GTN with more accurate and reliable data.

Chapter Summary

ITV is an old problem with new emphasis brought out from the Gulf War. To effectively deploy, sustain, and redeploy military forces, it is crucial to know the location of assets in the transportation system. Much can be learned from industry practices of incorporating the latest technology into logistical processes. The Global Transportation Network is TRANSCOM's technological answer to its ITV shortfalls. ITV will be achieved as a by-product of business processes relying on standard data and automated information systems (Young, 1995). It is scheduled to be operational from 1997 to 2010 and cost one-half billion dollars. The effectiveness of this ITV system will depend on a successful migration strategy for transportation computer systems. This strategy aims to reduce the number of independently developed systems by increasing the functionality of the migration systems, thus allowing all the services to benefit from their use. The Defense Transportation Regulation (DTR) is another key area which will help standardize the data being input into transportation computer systems. The publication of the DTR will eliminate redundancies among services and the conflicts between the old service regulations. The road to capturing all the ITV source data is one with many obstacles. In the next chapter, a closer look at these problem components will be explored to gain a better insight into possible solutions.

III. Problem Components

Chapter Overview

Capturing all the source data for an Intransit Visibility system involves overcoming many obstacles. This chapter discusses the obstacles which may prevent ITV from becoming a reality. Specifically, six component problems are presented. First, the large number of source computer systems makes integration of these systems difficult and expensive. Second, lack of standardized data input into source systems complicates their compatibility. Third, the level of detail in the visibility information may not offer field commanders enough information to make informed decisions. Fourth, there is little incentive for vendors to provide visibility into their transportation service. Fifth, Electronic Data Interchange is not standardized throughout the transportation community. Finally, bill of lading information in not always in an electronic format. An effective ITV system which captures all the source data is contingent upon solving the problem components mentioned above.

Quantity of Sources

Early ITV proof-of-concept studies demonstrated that a push system to an integrated data base was the most efficient method of accomplishing ITV goals (DoD, 1995: 1-4). This initiative required identifying computer systems which processed transportation information. As mentioned in Chapter II, there were 137 different computer systems which contained transportation information at the beginning of the migration strategy. Establishing links and conversions to each of these systems would have been a monumental and expensive task. Reducing the number of systems was the selected choice of action but proved to be no small task. Reduction of sources had the advantage of reduced personnel and maintenance costs.

Implementing a migration strategy created additional problems in the attempt to successfully reduce the number of transportation systems. Many different organizations had unique systems which were tailor-made to suit their needs. Replacing these systems with ones that, to the old system owners, seemed more cumbersome and less efficient created some controversy (Whitaker, 1996). The military evaluation system rewards people for managing expensive systems which require many people to maintain. Elimination of these systems, which also eliminated the personnel slots required to maintain them, created feelings of insecurity among the people who had developed and maintained these systems for years. The organizational structure which was very familiar and comfortable to the old system administrators became fragmented and dispersed. As one can imagine, the debates over which systems became migration systems was very contentious among rival organizations (Whitaker, 1996).

In addition to the rivalries between organizations, the rivalry between services also slowed the migration strategy as USTRANSCOM attempted to create a true "purple" solution (Whitaker, 1996). When the JTCC began looking at how each service went about moving cargo and passengers, it found that the core processes were the same for all the services (Whitaker, 1996). The former views held by each of the services were that their operations were unique to the other services. In fact, JTCC found that this was not the case and the core process of each service was the same (Whitaker, 1996). This finding is significant in that service-wide standards could now be set and different services could use the same systems to process cargo and personnel.

A final issue with the migration strategy as it relates to ITV is the element of time. Many people question when the system will be available. ITV is dependent on source systems for the location of assets within the DTS. If these source systems are being redesigned, the interface to GTN's ITV module will have to be modified whenever a source system is changed. This problem will be alleviated with standard data elements but in the meantime complete ITV must wait.

Data Standardization

Besides the migration strategy, the JTCC was also chartered to improve the efficiency and effectiveness of the DTS through data standardization (JTCC, 1996). The JTCC began by identifying different data elements. Data elements are a means to label and format information. For example, the International Civil Aviation Organization (ICAO) has a four digit code for all the major airports throughout the world. The aerial ports use a three digit Air Terminal Identifier Code to identify the same location. For Ramstein Air Base, Germany, the ICAO code is EDAR and the Air Terminal Identifier Code is RMS. Reconciling data element differences is the goal of data standardization. When different codes are found which represent the same thing, these codes are combined into a logical data model. A logical data model is a computer program which allows a user to input one code and identify all the different codes for the same data element.

Presently, JTCC has identified 1187 different data elements. Of these elements, 788 have been approved by OSD for use in transportation computer systems (JTCC, 1996). These data elements combined with a logical data model form the nucleus to implement data standards (Whitaker, 1996). The transportation logical data model draws its data dictionary from the nine functional areas identified in the migration strategy. This 18-month effort to define data elements used functional experts from the field to decide what is meant by each data element (Mosman, 1996).

Implementation of data standardization is critical for the success of ITV. At an interactive workshop on integrating commercial and defense transportation, 18 of 24 respondents agreed or strongly agreed that "if DoD fails to improve the quality of data in its key transportation and logistics systems, ITV efforts are wasted" (Wykle and Wolfe, 1993: 8). Currently, GTN must use translators to convert the incoming data to a recognizable form. This requires the extra expense of managing many different conventions and conversions and the possibility of incoming data being unusable (Mosman, 1996). At the core of standardizing data elements is the necessity of each service agreeing on the meaning of the terminology. A common example used to illustrate how different services interpret things differently is when members of each service are told to "secure the building." The Navy personnel respond by turning off the light and locking the door. The Army would occupy the building so no one could enter. The Marines would assault the building, capture it, and defend it with aggressive fire and close combat. The Air Force, on the other hand, would take out a three year lease with the option to buy (ACSC, 1994: A3-1). Although this is a humorous example, it illustrates a fundamental problem with joint operations: the services do not speak the same language. If the source data captured by the ITV module of GTN is to be useful, the meaning of this data must be universally understood or translated to information meaningful to each service.

Level of Detail

A big difference between commercial Intransit Visibility and DTS Intransit Visibility is the level of detail required for the contents of packages and containers. Commercial companies typically are not required to know the contents of their shipper's packages. They know where the package is located, but the content is most likely stored in the shipper's or receiver's proprietary database (Wykle and Wolfe, 1993: 10). If the customer wants the carrier to track detailed content information, it is usually accompanied with an increased price. This level of detail issue surfaced at the National Defense Transportation Agency's interactive workshop (Wykle and Wolfe, 1993: 10).

Colonel Mike McFarlin, chief of the Transportation Management Division at the Army Materiel Command in 1992, argued strongly for detailed line-item contents of all shipments (Wykle and Wolfe, 1993: 9). McFarlin, as well as other military leaders, felt that because of the military's unique mission, cursory level information was insufficient. Factors unique to the military included "dramatic surges in volume, the fluid nature of unit positions, the inherent hazards of a military enterprise, and the potential for breakdowns in the discipline or functioning of a centralized system" (Wykle and Wolfe, 1993: 10). Because of these factors, the military will not only need to capture accurate, detailed data in a central database, but have an on-site capabliity for determining container contents. Electronic or other tags on the containers enhance on-site capability for determining container contents (Wykle and Wolfe, 1993: 10). Without this accurate, detailed, on-site data, port personnel may have to resort to opening containers again to determine their contents.

Vendor Deliveries

Capturing visibility data at the source of the shipment process is where ITV begins. The status of these assets can then be updated as the shipment proceeds through each node of the transportation network. At military installations, the Department of Defense has more control over the originating documentation. When a shipment originates from a vendor's warehouse or production facility, the shipment information may only reside in the vendor's proprietary database. Capturing this information represents a significant challenge for the achievement of complete ITV.

According to DoD data, more than one-third of all defense shipments originate from commercial vendors. During the Gulf War, 36 percent of all re-supply shipments came from direct vendor deliveries (DoD, 1995: 3-14). With the continued down-sizing of the military, this trend is likely to increase.

Visibility over assets shipped directly from the vendor to the final destination or to the Port of Embarkation (POE) represents a critical hole in the ITV process. This shortfall is even greater when the terms of sale are free-on-board (FOB) destination (DoD, 1995: 3-15). Under FOB destination, the vendor delivers goods to a location specified by the buyer. At this location, the title and risk is transferred to the buyer. There is little incentive for vendors to supply DoD with asset visibility for these shipments because they are not owned by DoD until transfer is accomplished at the destination (DoD, 1995: 3-15). Possible alternatives for capturing vendor direct delivery movement information are discussed in Chapter IV.

Electronic Data Interchange (EDI)

Electronic data interchange is the direct computer-to-computer communication via a telecommunications system (Udo, 1993: 33). EDI eliminates the need for different organizations to independently input data into their own computer systems. The electronic transfer of information reduces costs, speeds processes, eliminates data re-entry, and decreases the number of errors (Alderson, 1993: 20). Within the commercial sector, EDI has become a necessity for organizations to remain competitive (Barber, 1991: 35).

The Defense Information Systems Agency (DISA) is the DoD organization responsible for maintaining information technology standards and conventions. The distinction between standards and conventions is important. Standards provide the format framework for how a specific EDI message will be transmitted. Conventions define how trading partners will use the standards for their mutual needs (DISA, 1995: WWWeb). The standards are developed by consensus among a large number of users to accommodate a full range of business activities for all industries. Within the United States, the American National Standards Institute's (ANSI) ASC X 12 is the EDI standard in use (Holevar, 1995). This broad standard is intended as a superset to meet the diverse requirements of all users (DISA, 1995: WWWeb). Because ASC X 12 contains more data elements and structure options than any one user or industry needs, implementation conventions are required to fully define the transactions (DISA, 1995: WWWeb). "Implementation conventions define the exact transactions required to conduct business by tailoring the use of the standards' segments, data elements and code values" (DISA, 1995: WWWeb). In addition, they document the intended interpretation of a standard. Implementation conventions are required for the DoD to effectively execute EDI (DISA, 1995: WWWeb).

The process of developing implementation conventions begins with the user. A command, service, defense agency or functional working group develops a proposed implementation standard and submits the draft to the DoD EDI Standards Management Committee (EDISMC). If the draft is approved by the committee, it sends the draft to the Federal Standards Management Coordinating Committee (FED SMCC). If it is accepted by the FED SMCC, the implementation convention is included in the catalog of federal implementation conventions (DISA, 1995: WWWeb). This bureaucratic process necessary to develop an implementation convention is an obstacle that all users within DoD must overcome to use EDI in their business transactions.

Bill of Lading

With regard to CONUS surface transportation, the bill of lading is the single most important shipping document in the shipping process (Tyworth and others, 1991: 168). It accomplishes two key functions. First, it serves as a contract between a shipper and the carrier. Second, it serves as a receipt of goods shipped (Tyworth and others, 1991: 168). The bill of lading also contains information about the goods being shipped. The carrier is legally responsible for producing the bill of lading but many organizations will utilize their own forms. The government bill of lading (GBL) is a special bill of lading used when the U.S. military contracts with commercial carriers for transportation needs. The GBL was created by the General Accounting Office (GAO) and is prepared by the government-agency shipper. It serves as "a type of draft on the U.S. treasury" (Tyworth and others, 1991: 171). "The Department of Defense issues more than 1.3 million freight GBLs every year" (DoD, 1995: 1-7).

Bills of lading offer good opportunities to capture visibility information of U.S. military contracted shipments. One problem is that the bills of lading are not all computerized. Because the bills of lading are not all in electronic form, transferring the information is more difficult and time consuming. In February 1994, DoD began using EDI for GBLs (DoD, 1995: 3-11). Initial success in converting over to this format created optimism for the concept but many carriers had to adapt their computer systems and transaction sets to become compatible with the DoD's system. Other carriers not currently using electronic GBLs are forced into a significant capital investment to become compatible.

Chapter Summary

There are many obstacles preventing an ITV system from capturing all the source data. The large number of transportation computer systems initially made the task seem insurmountable. Reduction of the number of computer systems to ones with increased functional coverage created many rivalries among organizations and services as their computer systems competed for migration status. Additionally, the migration strategy competition delayed the production of an ITV system. The complete ITV system was required to wait for source selection and the subsequent redesign of these source systems. Another obstacle to developing an ITV system is data standardization. Since all services will use the ITV system, the data must be meaningful and universally understood. Not only should it be universally understood, but the data should provide the level of detail necessary to make strategic and tactical decisions.

On the commercial side, there are also many obstacles affecting the visibility of intransit assets. Currently, the military is unable to capture vendor direct delivery information especially when it is FOB origin. Complicating this problem is the lack of EDI standards within the transportation industry and DoD. Additionally, many small carriers do not use electronic bills of lading and some larger carriers have already developed their company-wide standards which are incompatible with the proposed DoD standard. In the next chapter, possible alternatives to these problem components will be discussed.

IV. Alternatives

Chapter Overview

The previous chapter addressed the obstacles hindering ITV from becoming a reality. This chapter discusses alternatives to these obstacles. In particular, this chapter reviews possibilities on how USTRANSCOM can reduce the number of source systems and standardize the input data. It offers alternatives on capturing vendor delivery information and implementing Electronic Data Interchange (EDI) procedures for payments and bills of lading. The final section of this chapter presents a cursory view of existing technology which reduces the need for manual updates to automated processes.

Quantity of Sources

Reducing the number of source computer systems which provide data to the Global Transportation Network's (GTN's) ITV module is being accomplished through the migration strategy. As the lead agency of the migration strategy, the Joint Transportation Corporate Information Management (CIM) Center (JTCC) makes recommendations to the Office of the Secretary of Defense (OSD). OSD then approves or denies JTCC's recommendations. It is important to remember that the migration strategy is a competition where there are winners and losers. The winning computer system, in most cases, must be modified to incorporate features of the losers. As these modified winners come on-line, the old systems are phased out. There is some overlap between the time the new system is fully operational and the time the legacy systems are shut down.

A possible solution to reduce the inter-service and inter-agency rivalries is for OSD to set the course of the migration strategy and JTCC mediate the conflicts. Once a system has been identified as a legacy system, JTCC should establish a shut-down time and OSD should discontinue funding after that point (Whitaker, 1996). The common core processes which cut across service boundaries combined with shrinking defense dollars necessitate the implementation of a "purple" solution. Transportation computer systems must be used by more than one service (Whitaker, 1996).

Data Standardization

The goal of the data standardization effort is to ensure the data captured by the source computer systems is meaningful to the decision makers. While the data standardization efforts are in progress, an interim solution is necessary. For unit deployments, transportation specialist should deploy to the unit location and act in a supervisory role to ensure data is correctly input into the service's TC-AIMS computer systems (Woodworth, 1993: 19). For a long term solution, proposed computer systems need to have accurately defined data elements in the proposal stage of their development. All computer acquisitions over $2 million must be reviewed by a Major Automated Information System Review Council (MAISRC). This council can screen computer system proposals for data standardization and ensure compliance with the approved data elements (Mosman, 1996). An oversight agency, such as MAISRC, would ensure that there is an adequate control mechanism for data standardization.

Vendor Deliveries

The Defense Intransit Visibility Integration Plan outlines three options to capture asset visibility information from direct vendor deliveries. The first option has the vendor using EDI to transmit ASC X 12 858 formatted transaction sets to the appropriate transportation component command. For air shipments with destinations outside the U.S., the vendor would send this information to the AMC's Headquarters On-line System for Transportation (HOST). For surface movements destined outside the U.S., the vendors' EDI transmissions would be sent to the Military Traffic Management Command's (MTMC) Worldwide Port System (WPS). For all other shipments, vendors would send their EDI transmissions to MTMC's CONUS Freight Management (CFM) system. These systems would then update the ITV module of GTN. This option requires DoD to establish EDI links with all of its commercial vendors (DoD, 1995, 3-15). The most likely incentive for vendors to provide this service would come from increased financial compensation.

The second alternative is a variation of the first with the carrier making the EDI transaction to the transportation component command's computer systems instead of the vendor (DoD, 1995, 3-16). The vendor would provide the carrier with electronic or hard-copy shipment information. Then, the carrier would use the same ASC X 12 858 EDI transaction set to pass the information to HOST, WPS, or CFM. This option requires DoD to establish EDI links with all the commercial carriers (DoD, 1995, 3-16). Additionally, carriers who are not EDI capable would need to establish this ability for this option to be feasible.

The third option is to modify the procurement process where the DoD buys all of its supplies and equipment FOB origin. This option requires the DoD to arrange the shipment of goods from the point of sale to the final destination. FOB origin gives DoD more control over the shipment process but increases the administrative costs in handling shipments. "The additional burden of managing document preparation, data standardization, and procedural compliance may make this alternative too costly, which limits its application" (DoD, 1995, 3-16). These options are graphically illustrated in Figure 3.

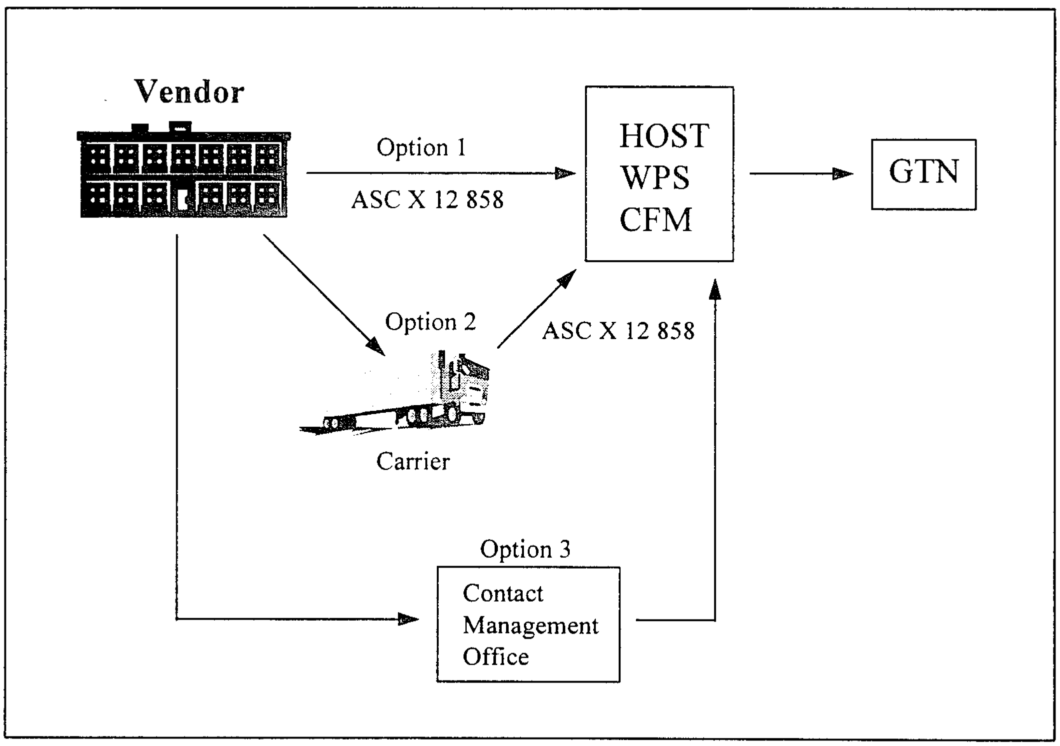

Figure 3: Vendor Direct Delivery Options (DoD, 1995: 3-16)

None of the individual three alternatives presented by DoD completely solve the asset visibility problem of capturing vendor direct delivery information. Using a combination of the three alternatives offers some visibility but still falls short. Option one and two can be used with vendors and carriers who are EDI capable and can transmit using the ASC X 12 858 transaction set. A manual method is still needed for vendors and carriers who are unable to comply with the EDI restriction. Option three could incorporate a manual input feature. The contract management office could input the vendor shipment information into DLA's Transportation Automated Management System (TRAMS) which would then transmit via an EDI ASC X 12 858 transaction set to the transportation component command's computer system. Using all three alternatives with the manual feature incorporated in option three helps in capturing most of the vendor direct delivery information. An implementation plan for capturing vendor direct delivery shipments is summarized in Table 4.

As the military shrinks, an increased reliance on the commercial sector necessitates the development of strategic alliances with commercial firms. The DoD has monopsony power among many commercial vendors. Because it is the principal buyer of many unique parts and equipment, the DoD has great influence over these suppliers. It is in both the DoD's and vendor's best interest to develop an asset visibility service.

Table 4: Vendor Implementation Plan (DoD, 1995: C-19)

1.0 Identify functional requirements
1.1 Assess alternative operating concepts
1.2 Select best concept
1.3 Detail data requirements
1.4 Identify and develop policy, regulation, and procedural changes
2.0 Review EDI standards and conventions
2.1 Map data requirements to ASC X 12 858 Transaction Set
2.2 Modify the ASC X 12 858 Transaction Set
2.3 Prepare data conventions
3.0 Specify technical operating requirements
3.1 Review and complete hardware specifications
3.2 Identify software requirements
3.3 Establish telecommunications strategy
4.0 Integrate and test system
4.1 Procure and install hardware and software
4.2 Modify application systems
4.3 Develop interface programs
4.4 Arrange for telecommunications
4.5 Update operating procedures
4.6 Train operators
4.7 Test, evaluate, and modify system
5.0 Establish trading partner relationships
5.1 Develop trading partner implementation strategy
5.2 Prepare and distribute trading partner information
5.3 Solicit trading partners and execute trading partner agreements
6.0 Implement production system

Electronic Data Interchange (EDI)

As illustrated in Figure 3, capturing vendor direct delivery information is dependent on Electronic Data Interchange (EDI). EDI offers the capability to quickly and accurately transfer large amounts of information. The Air Force Materiel Command has previously demonstrated the successful use of the ASC X 12 858 transaction set (DoD, 1995: 3-10). Mapping domestic shipment information and Military Standard Transportation and Movement Procedures (MILSTAMP) to the ASC X 12 858 transaction set is known as enhancing Transportation Control and Movement Document (TCMD) data. Completion of the enhanced TCMD data and incorporation in the Defense Transportation Regulation will help capture much of the originating defense shipments.

The use of EDI also offers vendors and carriers quicker payment possibilities. This is a big incentive to vendors and carriers who routinely contract with the government. Because of the bureaucratic process involved in government payments, a supplier can wait up to six months to get paid (DoD, 1995: 1-7). With the use of EDI, payment can be made within days upon electronic verification of the service. Once an invoice is received by the transportation payment center from the carrier, it is matched to a shipment verification and payment is made via electronic funds transfer (DoD, 1995: 1-7). The shipment verification provides an excellent method for updating the visibility of intransit assets. This process is illustrated in Figure 4.

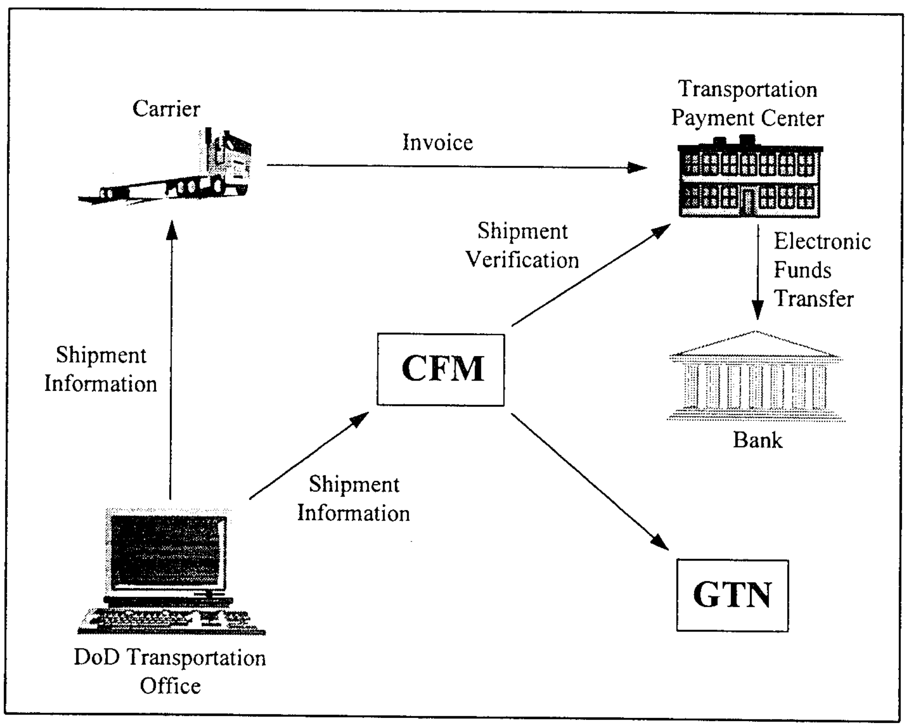

Figure 4: Defense Transportation EDI Operating Concept (DoD, 1995: 1-7)

Bill of Lading

Although the bill of lading is used for many purposes, the information about the goods being shipped is the most useful for the ITV system. For bill of lading information to be rapidly transmitted, it must be in electronic form and use EDI. Using EDI for bill of lading information is a service not formerly required of the carriers. Enticing carriers to use EDI for bills of lading requires a modification in the contracting process. When the government solicits request for proposals or enters into competitive negotiations, an EDI requirement needs to be explicitly stated. Contract award should go to the carrier who can provide the required services for the government. Additionally, contractors should inform carriers of the quicker payment opportunities available using this format. As the U.S. continues into the information age, electronic transmissions will be the rule rather than the exception.

Automatic Identification Technology (AIT)

A complementary set of technology to Electronic Data Interchange (EDI) is Automatic Identification Technology (AIT). Where EDI is good for reporting transaction information, it does not capture information about discrete transactions. An example of a discrete transaction is where a pallet is placed into a container and the container passes through a checkpoint. EDI cannot record the placement of this pallet into the container but AIT offers an excellent tool for capturing this information (Wolfe, 1994: 25). Perhaps the greatest strength of AIT is its "on-site" data stored in bar codes, laser optical cards, and radio frequency identification tags (Wolfe, 1994: 25). Having the on-site ability to transfer data about container contents can alleviate the necessity of opening it.

There are many commercially available technologies and emerging technological innovations which have great potential for providing ITV information as well as on-site visibility of assets. Because of the unacceptably high risk of inadequate communications capabilities throughout the world, "DoD needs to augment its data collection efforts with electronic tagging technology" (DoD, 1995: 2-9). This would allow port handlers the ability to inventory containerized shipments without compromising the integrity of the seal. Some of the available technology and the technological innovations are described below.

Bar Coding. Linear bar coding is the most popular form in use today. It is recognized by "an array of narrow rectangular bars and spaces that represent a single character in a particular symbology" (AFMC, 1995: 2). Various types of bar codes include the Universal Product Code (UPC), interleaved 2 of 5, code 3 of 9, and code 128. UPC was developed for the food industry and expanded to non-food items. It is a fixed length numeric only symbology used to uniquely mark and identify products (AMFC, 1995: 2). Interleaved 2 of 5 is a numeric symbology of variable length used for uniform containers. Code 3 of 9 is an alphanumeric (up to 43 different characters), variable length code used throughout DoD, the automotive industry, and the medical industry (Ross, 1996). Code 128 is a variable length alphanumeric code capable of supporting the entire American Scientific Code for Information Interchange (ASCII) character set (AFMC, 1995: 2). Only code 3 of 9 has been approved for use within the DoD until evaluation of other symbologies is complete. The types of linear bar codes are summarized in Table 5.

Table 5: Linear Bar Code Types (AFPC, 1995: 2)

Code	**Length**	**Symbology**
UPC	Fixed	Numeric
2 of 5	Variable	Numeric
3 of 9	Variable	Alphanumeric (Uppercase letters and some special char)
128	Variable	Alphanumeric (full ASCII character set)

Two-Dimensional Bar Coding. A variation of the linear bar code is the two-dimensional bar code which makes use of both horizontal and vertical directions when encoding data. This type of bar code increases the number of data that can be stored from 17 characters for linear bar codes to 2000 alphanumeric characters (AFMC, 1995: 2). It is presently being incorporated on the back of U.S. armed forces identification cards (Ross, 1996). A distinct advantage of this type of code is that it can sustain considerable damage and still maintain readability (AFMC, 1995: 3). While rapid growth is expected in two dimensional applications, linear bar codes will remain the dominate bar code symbology for the near term (AFMC, 1995: 3).

Radio Frequency Identification (RFID). Another technology gaining increased popularity is radio frequency identification (RFID). This technology uses RFID labels known as tags or transformers located on equipment or containers. A reader or interrogator uses radio frequency energy to communicate with these tags. A single tag can contain up to two megabytes of data depending on the type of tag (Gross, 1995: 4-2).

RFID tags have many characteristics. One characteristic is whether a tag is passive or active. Passive tags do not require a battery and use the incident radio frequency energy to activate and transmit. Active tags have self contained power sources such as lithium batteries and use the self-generated electrical fields for transmission (Torres, 1994: 36). Another attribute of RFID tags is the distance they can transmit or reflect energy. In general, passive tags are used for short distances and active tags for longer distances. As RFID technology continues to gain widespread use, the cost continues to drop. Passive tags range from $1 to $75 where active tags range from $55 to $200 depending on memory capacity and other features (AFMC, 1995: 17). Future costs will depend on tag popularity and production efficiencies. Other tag characteristics include read/write capability and line of sight requirements. These RFID tag attributes are summarized in Table 6.

Table 6: RFID Tag Attributes (Gross, 1995: 4-2)

Manufacturing Company	Active or Passive	Line of Sight Requirement	Read/Write Capability	Memory Size	Range
ASGI	Passive	Yes	Yes	115 bytes	< 2.5 m
AT/Comm	Active	No	Yes	10 Kb	>2000 ft
ID Systems	Active	No	Yes	64 Kb	50 m
Intellitag	Passive	No	Yes	2 Mb	> 10 m
Rand Technologies	Active	No	Yes	128 Kb	150 m
Saab Scania Combitech	Passive	No	Yes	8 Kb	> 10 m
Savi Technology	Active	No	Yes	128 Kb	150 m
Single Chip Solutions	Passive	Yes	Yes	1 Kb	< 2 m
Texas Instruments	Passive	No	Yes	512 bits	< 2 m
XCI	Passive	Yes	No	26 bits	10 m

With the use of RFID, people and assets can be located, categorized, and identified over relatively short distances. RFID has already proved its worth in warehousing, shipping and automotive manufacturing (Torres, 1994: 36). Because of its durability and increasing popularity, this technology has great potential for future port operations.

Automatic Information Technology offers the possibility to greatly improve efficiencies at the ports and enhance the ITV system. These technologies can be used to automatically update the port's computer system which in turn updates GTN. Because it is automatic, human resource requirements and data input errors would be minimized.

Chapter Summary

Capturing the source data for the ITV system involves overcoming many obstacles. First, different services and agencies must learn to use common computer systems with broad functional coverage in their day-to-day work. The reduction of computer systems saves valuable defense dollars and reduces the managerial burden of the ITV system. Second, common systems used by different services require standardization of the input data. In the short term, data standardization is accomplished with cross-service training programs. In the long term, standardization of data is accomplished in the development stage of new information systems. Third, capturing vendor delivery data must be overcome for an effective ITV system. All options for capturing vendor delivery data involve using Electronic Data Interchange (EDI). Options for the origination of the EDI transmissions include the vendor, the carrier, or a contract management office and proceed to the transportation component command's computer system. The component command's systems then update the ITV integrated database. Much work remains in capturing direct vendor delivery information. Fourth, capturing bill of lading information using EDI transmissions offers an excellent source of transportation information as well as quicker payment options for the carriers. Finally, there are many Automatic Identification Technologies (AITs) available to reduce the number of human-machine interactions. Linear bar coding, two-dimensional bar coding, and Radio Frequency Identification (RFID) are just a few which offer great potential.

Chapter V responds to some of the problems of capturing all the Intransit Visibility source data by addressing the investigative questions introduced in Chapter I. Specifically, the chapter illustrates the future look of the Global Transportation Network and explains how users can access the ITV information in this integrated database. Chapter V concludes with a summary of this research paper.

V. Conclusion

Chapter Overview

In this chapter, the investigative questions introduced in Chapter I are restated and answered. The answers draw upon information presented throughout this research paper. The chapter concludes with a summary of the research paper.

Investigative Question One

1. What systems provide transportation information to the ITV module of GTN?

There are currently eight systems which provide the ITV module of GTN with transportation information as described in Chapter II. The long-term plan calls for a total of 19 systems feeding the GTN integrated database with ITV information (DISA Vol. 1, 1995: 21). In addition, the plan calls for GTN to pass selected information to eight different high level computer systems used for decision making. Because of the fluid environment of computer information systems, the actual systems which eventually provide GTN with inputs are likely to change. Figure 5 provides a snapshot in time of the proposed architecture. The computer systems are described in Appendix A.

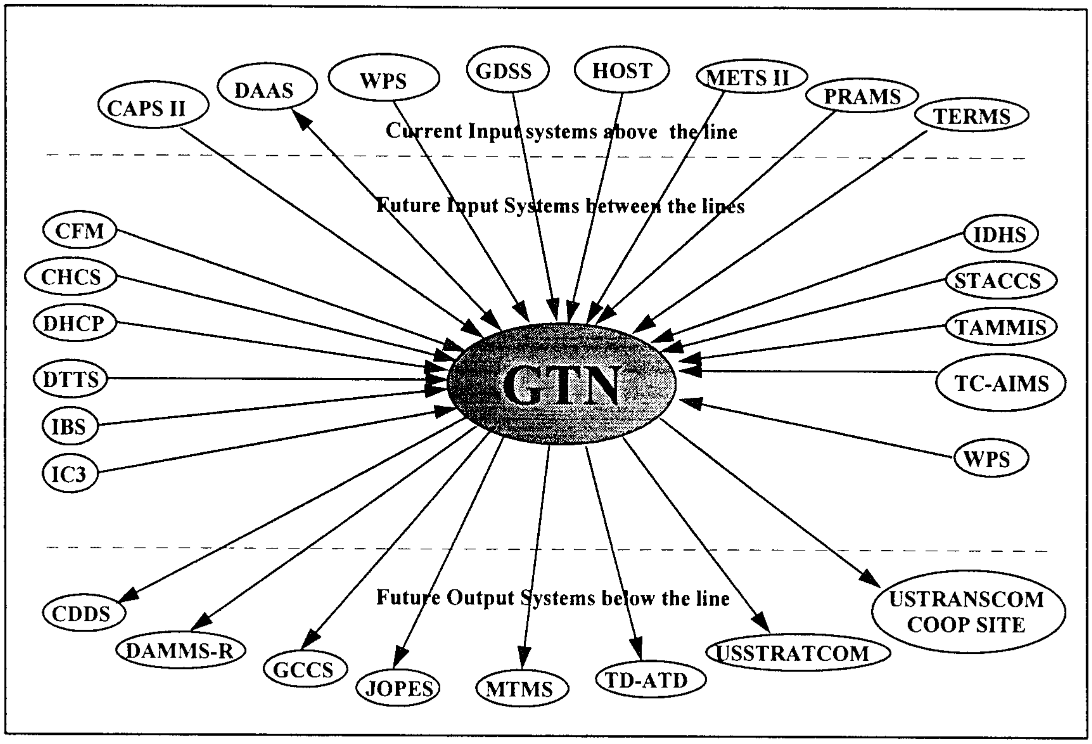

Figure 5: Future GTN Interfaces (DISA Vol. 1, 1995: 21)

Investigative Question Two

2. How is the input data standardized?

The Defense Transportation Regulation (DTR) establishes common procedures for the movement of passengers, freight, personal property, and units from origin to destination (Rutherford, 1995: 10). As this regulation is used by all services, it helps to standardize the process. Standardization of the actual data is more difficult. First, data elements are identified by functional experts in all the services. The data elements are then combined to form a logical data model which is subsequently used to implement data standards. Ray Mosman, Component Data Administrator in USTRANSCOM's JTCC, believes that there will eventually be 1,800 different data elements and the standardization efforts will continue into the next century (Mosman, 1996). Once the standardized data is used by all transportation computer systems, compatibility between the various systems will be greatly advanced.

Greg Holevar of AFMC believes that the data does not need to be standardized. He equates data standardization to the United Nations telling all members that they must speak English. Holevar advocates the use of translators because there are too many systems with unique functions (Holevar, 1995).

Investigative Question Three

3. How is all the source data captured?

The source data for the ITV system is captured as a by-product of daily business operations. If the source data originates at a military installation, the computer system used in processing personnel and equipment sends the manifest information to the ITV module of GTN. At present, links to all the source computer systems are not yet established. As illustrated in Figure 5, there is still much work to be done. As the migration strategy progresses, the links with the existing systems must be continuously modified to account for the increased functionality of the source system.

If the source data originates with a vendor, it is more difficult to capture. Capturing vendor direct delivery information is dependent on establishing an effective Electronic Data Interchange (EDI) capability with vendors and/or carriers. There must be an incentive for vendors and carriers to supply DoD with visibility information. Establishing new procedures for the way DoD contracts offers a possibility. With the vendors, the required EDI service must be explicitly stated in the contract. With the carriers, the new Defense Transportation Regulation allows more flexibility to the contractors when seeking for-hire service. Relating EDI service to how quickly payments are processed provides another incentive for vendors and carriers to provide EDI service.

Investigative Question Four

4. Who are the users and how will they access ITV information?

The users of the ITV system cover a wide range. They include requisitioners, suppliers, operators, transportation managers, planners, and commanders. Currently, there are over 3,000 accounts with the GTN prototype (Isack, 1995). Any computer capable of operating or emulating a Virtual Terminal 100 (VT-100), VT-102, VT-220, or VT-320 can be used as a GTN workstation (GTNPMO, 1995: 3-1). For most field users, a commercial communications software package such as Frontier Technologies' Super TCP (Transmission Control Protocol) combined with a modem equipped computer is adequate. Additionally, users must establish an account with the GTN Program Management Office (PMO) at Scott AFB, IL. Appendix C supplies instructions for requesting a user account for GTN.

Investigative Question Five

5. Are the users and programmers talking to each other to insure the correct information is being processed?

The technology committee of the National Defense Transportation Association (NDTA) held an invitational workshop entitled "Intransit Visibility: Harmonizing the Process" in July 1994. At the workshop, the participants identified a focus on customer needs as one of their short-term recommendations. The goal of this recommendation was to ensure the needs of users will be met (Wolfe, 1994: 23).

Subsequently, USTRANSCOM has hosted a number of Joint Application Development (JAD) conferences throughout the development of the GTN. The JAD conferences attempt to "maintain a climate which permits the users to refine delivery specific capabilities and solutions as the development process evolves" (LORAL, 1995: 1). Loral Corporation's Defense Systems East Division is continuing the JAD conferences to provide opportunities for user involvement in the design and development of system capabilities. The conferences meet at least once a quarter and USTRANSCOM provides the Temporary Duty (TDY) funds necessary for the users to participate (Zebroski, 1996). These conferences ensure the users a voice in the development process.

Research Paper Summary

Intransit Visibility (ITV) will be achieved by capturing information about cargo and passengers at their origin and updating this information as the cargo and passengers process through each node of the transportation network. Capturing the source and node information is a challenging task. Within the DoD, there are 137 different computer systems which process transportation information. The migration strategy is an attempt to reduce this number by categorizing all the systems in one of nine functional divisions. The systems which provide the best functional coverage are selected as migration systems. Another problem with the computer systems is that the data processed is not standardized, making compatibility between the various systems a difficult task. To solve this problem, the Joint Transportation Corporate Information Management Center is attempting to define data elements for use in all transportation information systems.

The Global Transportation Network (GTN) is the system which will integrate the ITV information provided by 19 other computer systems. GTN's service life is forecast from 1997 to 2010 at a cost of one-half billion dollars. The benefits provided by GTN are knowledge of the flow of assets, reduction in reordering supplies, the ability to foretell lift requirements, elimination of uncertainty, and a reduction in operating costs.

Since many resupply and sustainment assets are shipped commercially, the ITV system must capture visibility into this segment of the transportation network. Establishing strategic alliances with commercial vendors and carriers is one way to ensure access to their visibility information. Using Electronic Data Interchange (EDI) to transmit this data will ensure it is timely.

The first step in creating an effective ITV system is to capture all the source data. After it is captured, it can be formatted and presented in a cohesive manner. Without all the source data, holes will exist in the ITV system and the DoD will be destined to repeat the mistakes of past deployments. Better ITV in peacetime will save money and in wartime will save lives.

Appendix A*

System Descriptions

The follow appendix describes ITV and migration systems. The organization or office in parenthesis is the lead agency for the system.

ADANS - AMC Deployment Analysis System (AMC)

Prepares movement tables and schedules for operation plans, operations orders, channel requirements, and tanker schedules. It assists in transportation feasibility analyses.

ALM - Air Load Module (MTMC)

Knowledge based "expert" system that assists users of the system in the complex task of loading Air Force primary organic mission aircraft. It is a module of the Transportation Coordinator Automated Command and Control Information System (TC-ACCIS).

AMP - Analysis of Mobility Platform (USTRANSCOM)

Provides the capability to rapidly analyze the transportation feasibility of a specific Time Phased Force Deployment Data (TPFDD) against a planner defined transportation environment. Uses ELIST, JFAST, and AMS to provide this capability.

AMS - Asset Management System (MTMC)

Provides up-to-date information on movement of critical items. AMS is the only system that adequately manages the DoD common user intermodal container and rail fleet for high-level transportation planning and execution purposes.

C2IPS - Command and Control Information Processing System (AMC)

Enables AMC organizations to exchange information between the operation, logistics, transportation, and intelligence

*Compiled from Department of Defense's Defense Intransit Visibility Integration Plan, February 1995 and Defense Information Systems Agency's (DISAs) Integration Decision Paper for USTRANSCOM's JTCC, 1 Feb 1995.

functional areas. It will be a single, integrated computer system to aid the command and control activities in the theater.

CANTRACS - Canadian Transportation Automated Control System (DLA)

Cargo routing and rating system which supports shipments originating in Canada. It maintains all Canadian commercial freight tenders and contracts. CANTRACS provides transportation personnel with a single user interface for entering shipment request data. Through a validation process, the system assures that all mandatory MILSTAMP data elements, equipment codes and Service unique criteria are valid for the type of shipment being entered. A standard bill of lading printing capability is included to aid in the document distribution to contractors and consignees.

CAPS II - Consolidated Aerial Port System II (AMC)

A real-time, minicomputer-based system used at aerial ports to carry out local cargo, mail, and passenger processing functions. It operates through a dedicated circuit to Headquarters On-Line System for Transportation (HOST) computers. This system permits review and evaluation of cargo and passenger movements on a real time basis. It includes the Aerial Port Documentation and Management System (ADAM III) that supports cargo shipments and the Passenger Automated Check-In System (PACS) that tracks passengers.

CDSS - CINC Decision Support System

GTN will update this system with decision support data.

CFM - CONUS Freight Management (MTMC)

Provides support to DoD transportation processing and planning through interfaces with Defense transportation and commercial transportation systems. It automates shipment planning and document preparation. Through the use of EDI techniques, it exchanges shipment information with users from transportation offices, carriers, and the Defense Finance and Accounting Service.

CMOS	-	Cargo Movement Operations System (USAF) The Air Force's TC-AIMS system that automates base level cargo movement processes and provides transportation movement officers with current unit movement data.
CODES	-	Computerized Deployment System (MTMC) Load planning tool designed to support MTMC's mobilization mission and peacetime load planning requirements.
DAAS	-	Defense Automatic Addressing System (DLA) Records MILSTRIP and other transactions and routes them among the various wholesale and retail activities.
DAMMS-R	-	Department of the Army Movements Management System - Redesigned (USA) Provides transportation information to movements managers, highway regulators, and mode operators. It consists of seven interrelated subsystems: shipment management, movement control team operations, mode operations, addressing, highway regulation, convoy planning, and movement programming.
DASPS-E	-	Department of the Army Standard Port System-Enhanced (USA) Records cargo arrival, staging, and departing information for OCONUS ports. It will be replaced by the Worldwide Port System (WPS).
DTTS	-	Defense Transportation Tracking System (DoD/USN/MTMC) Monitors all intra-CONUS arms, ammunition, and explosives shipments moving by truck. It performs this task using a commercial satellite tracking surveillance service, which provides DTTS with hourly truck location reports, intransit truck status changes, and emergency situation notifications.
ELIST	-	Enhanced Logistics Intra-Theater Support Tool (MTMC) Compares the planned theater arrival schedule against a theater's transportation assets, cargo handling equipment, facilities and routes.

GCCS - Global Command and Control System (JCS)

A future replacement system for the Joint Operations Planning and Execution System (JOPES); it will use an open systems architecture.

GDSS - Global Decision Support System (AMC)

Records and displays airlift schedules, aircraft arrivals and departures, and limited aircraft status. It provides executive-level decision support.

GTN - Global Transportation Network (USTRANSCOM)

Provides the automated support that USTRANSCOM and its components need to carryout their global transportation management responsibilities. It provides the integrated transportation data necessary to accomplish transportation planning, command and control, patient movement, and intransit visibility of units, passengers, and cargo during peace and war.

GOPAX - Group Operational Passenger System (MTMC)

Supports MTMC procurement of surface transportation and AMC procurement of air transportation for groups of 21 or more people traveling 450 or more miles. GOPAX performs the booking process for groups of passengers and passes the booking to the requester.

HOST - Headquarters On-line System for Transportation (AMC)

Comprised of six subsystems and contains airlift cargo data, worldwide manifest data, and air shipment information. It interfaces with the Military Service air clearance authorities and GTN. It provides a centralized record of on-hand cargo and cargo movements to AMC.

IBS - Integrated Booking System (MTMC)

A new traffic management system at Military Traffic Management Command area commands that will register cargo for sealift, provide schedules for unit arrival at ports, and issue port calls to units. It will include the functionality of the Military Export Traffic System II (METS II) and the Automated System for Processing Unit Requirements (ASPUR).

IC3	-	Integrated Command, Control, and Communications System (MSC) The Military Sealift Command's new command, control, and communications system that will be integrated with the Navy's Operations Support System. Both are under development.
ICODES	-	Integrated Computerized Deployment System (MTMC) Integrates multiple expert systems, databases, and graphical user interfaces within a computer-based, distributed, cooperative operational environment. This is a migration system to replace load planning CODES system.
IDHS	-	Intelligence Data Handling System Provides transportation infrastructure information. Collateral data, maps, graphics, and imagery will be transmitted to the SECRET portion GTN.
ITV-MOD (HOST)		Intransit Visibility Modernization (Headquarters On-Line System for Transportation) (AMC) Provides the link between the service air clearance authority and the aerial ports. Together with its subsystems, it provides advance air-eligible cargo notification, cargo status, and cargo tracking to USTRANSCOM, the services aerial ports, AMC, and MTMC. It integrates and coordinates the efforts of the aerial ports through an interchange of mission-related cargo movement information.
JALIS	-	Joint Air Logistics Information Support System (USN) Supports the scheduling function for Operational Support Aircraft (OSA).
JFAST	-	Joint Flow and Analysis System for Transportation (USTRANSCOM) Establishes an initial transportation requirement from the Time Phased Force Deployment Data (TPFDD). Determines closure, congestion points, lift utilization, and shortfalls for strategic lift. Projects delivery profiles, required lift by day versus lift available, and port workloads.

JOPES - Joint Operations Planning and Execution System (JCS)

The foundation of the DoD's conventional command and control system, which is comprised of policies, procedures, and reporting systems supported by automation. It is used to monitor, plan, and execute mobilization, deployment, employment, and sustainment activities in peace, exercises, crisis, and war.

LOGAIS - Logistics Automated Information System (USMC)

Consists of a family of Marine Corps planning, deployment, and redeployment systems that help bridge the gap between JOPES and other systems. This is the Marine Corps TC AIMS system.

METS II - Military Export Traffic System II (MTMC)

Provides schedules for units arriving at ports and issues port calls to the units. It supports the booking of all surface cargo and is the current traffic management system at MTMC area commands. It will be replaced by IBS.

MOBCON - Mobilization Control (USA NG)

Provides a unique capability to facilitate passing of hard-copy requests to state and local authorities for organic convoy clearance in support of CONUS unit movements from origin to POE and POD to destination.

NAOMIS - Navy Material Transportation Office Operations and Management System (USN)

Replacement system for the Navy Automated Transportation Systems (NATS) which was the Navy Air Clearance Authority system for CONUS to Outside CONUS (OCONUS) shipments. NAOMIS receives, processes and clears cargo offerings from Navy sponsored shippers.

PRAMS - Passenger Reservation and Movement System (AMC)

Records non-unit passenger reservations, issues boarding passes, and generates the aircraft manifest for fixed aerial ports of embarkation.

STACCS - Standard Theater Army Command and Control System (USA)

Provides automated decision support tools and a data collection capability to facilitate command and control of theater forces. It supports commanders and staffs at Echelons Above Corps and tracks Army unit movements within theater. The system is classified.

TAMMIS - Theater Army Movement Management Information System

TC ACCIS - Transportation Coordinator's Automated Command and Control Information System (USA)

The Army TC AIMS system that is used to plan and execute unit deployments and redeployments worldwide, communicate data to the Forces Command for updating the JOPES, and communicate to MTMC for port operations and load planning. It generates air load plans, air cargo manifests, unit movement data, convoy march tables and clearance requests, rail load plans, bills of lading, and bar-code labels.

TC-AIMS - Transportation Coordinator's Automated Information for Movement System (USA/USMC/USAF)

A family of systems that automates the planning, organizing, coordinating, and controlling of unit-related deployment activities supporting the overall deployment process. It permits transportation offices to maintain an automated data base of current unit movement data. TC AIMS family of systems include TC ACCIS, LOGAIS and CMOS.

TD-ATD - Total Distribution Advanced Technology Demonstration (USA)

Command and control system for logistical commanders at the strategic, operational and tactical levels. GTN will provide information on the status of forces and cargo moving in the Defense Transportation System.

TERMS - Terminal Management System (MTMC)

Records cargo data for surface movements at MTMC area commands. It also facilitates cargo receipt, staging, and planning at ports and generates the ship manifest upon completion of loading. This system will be replaced by WPS.

TOPS - Transportation Operational Personal Property Standard System (MTMC)

Automates the processes and procedures governing the movement and storage of personal property belonging to military members and DoD civilians. It provides the processing and communications necessary for source data automation and ensures the accurate and timely exchange of information between personal property offices and finance centers.

TRAC2ES - TRANSCOM Regulating and Command Control Evacuation System (TRANSCOM)

The medical component of GTN that functions as a command and control system to provide for global patient movement and regulation. It also provides patient intransit visibility, monitors critical patient medical equipment pools, and assists in round-trip transportation of patient attendants.

TRAMS - Transportation Automated Management System (DLA)

Processes shipment data and operates on a two-tier system architecture design. Its functions include entering and validating shipment requests, awarding shipments to carriers with reason codes for not selecting the low-cost carrier, recording service failures, creating Government bills of lading (GBLs) and correction notices, printing shipping documents, transmitting GBL data to host computers, creating transportation discrepancy reports, producing management reports, and applying local non-use carrier penalties.

WPS - Worldwide Port System (MTMC)

A new system being fielded that will function as the port operating system for military ocean terminals, Navy port activities, Army Transportation Terminal Units and Automated Cargo Documentation Detachments. It will replace TERMS and DASPS-E.

Appendix B

Acronym List

ACSC	Air Command and Staff College
ADANS	AMC Deployment Analysis System
AFMC	Air Force Material Command
AIT	Automatic Identification Technology
ALM	Air Load Module
AMC	Air Mobility Command
AMP	Analysis of Mobility Platform
AMS	Asset Management System
ANSI	American National Standards Institute
APOD	Aerial Port of Debarkation
APOE	Aerial Port of Embarkation
ASC	American Standard Code
ASCII	American Scientific Code for Information Interchange
C2IPS	Command and Control Information Processing System
CANTRANCS	Canadian Transportation Automated Control System
CAPS II	Consolidated Aerial Port System II
CBL	Commercial Bill of Lading
CDSS	CINC Decision Support System
CFM	CONUS Freight Management
CHCP	Composite Health Care System
CIM	Corporate Information Management
CINC	Commander-In-Chief
CMOS	Cargo Movement Operations System
CODES	Computerized Deployment System
CONUS	Continental United States
DAAS	Defense Automatic Addressing System
DAMMS-R	Department of the Army Movements Management System - Redesigned
DASP-E	Department of the Army Standard Port System - Enhanced
DBOF	Defense Business Operating Fund
DCINC	Deputy Commander-In-Chief
DHCP	Distributed Health Care Program
DISA	Defense Information Systems Agency
DLA	Defense Logistics Agency
DoD	Department of Defense
DTR	Defense Transportation Regulation
DTS	Defense Transportation System
DTTS	Defense Transportation Tracking System
DUSD(L)	Deputy Under Secretary of Defense for Logistics

DVD	Direct Vendor Delivery
EDI	Electronic Data Interchange
EDISMC	EDI Standards Management Committee
ELIST	Enhanced Logistics Intra-Theater Support Tool
FED SMCC	Federal Standards Management Coordinating Committee
FOB	Free On Board
FOC	Final Operational Capability
FY	Fiscal Year
GAO	Government Accounting Office
GBL	Government Bill of Lading
GCCS	Global Command and Control System
GDSS	Global Decision Support System
GOPAX	Group Operational Passenger System
GTN	Global Transportation Network
GTN	Global Transportation Network
HOST	Headquarters On-line System for Transportation
IBS	Integrated Booking System
IC3	Integrated Command, Control, and Communications System
ICAO	International Civil Aviation Organization
ICODES	Integrated Computerized Deployment System
IDHS	Intelligence Data Handling System
IDP	Integration Decision Paper
IOC	Initial Operational Capability
ITO	Installation Transportation Officer
ITV	Intransit Visibility
ITV MOD	Intransit Visibility Modernization
JAD	Joint Application Development
JALIS	Joint Air Logistics Information Support System
JFAST	Joint Flow and Analysis System for Transportation
JOPES	Joint Operations Planning and Operations System
JTCC	Joint Transportation CIM Center
Kb	Kilobyte
LCC/BA	Life Cycle Cost/Benefit Analysis
LOGAIS	Logistics Automated Information System
MAGTF	Marine Air-Ground Task Force
MAISRC	Major Automated Information System Review Council
Mb	Mega-Byte
MDSS II	MAGTF Deployment Support System II
METS II	Military Export Traffic System II
MILSTAMP	Military Standard Transportation and Movement Procedures
MLS	Multi-Level Security
MOBCON	Mobilization Control
MSC	Military Sealift Command
MTMC	Military Traffic Management Command
MTMS	Military Transportation Management System

NAOMIS	Navy Material Transportation Office Operations and Management System
NDTA	National Defense Transportation Association
OCONUS	Outside Continental United States
OD	Office of the Director
OSD	Office of the Secretary of Defense
PA&E	Program Analysis and Evaluation
PMO	Program Management Office
POD	Port of Debarkation
POE	Port of Embarkation
PRAMS	Passenger Reservation and Movement System
RFID	Radio Frequency Identification
SCI	Sensitive Compartmented Information
SDP	System Decision Paper
STACCS	Standard Theater Army Command and Control System
TAMMIS	Theater Army Movement Management Information System
TAV	Total Asset Visibility
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 Command
TCMD	Transportation Control and Movement Document
TCP	Transmission Control Protocol
TD-ATD	Total Distribution Advanced Technology Demonstration
TDY	Temporary Duty
TERMS	Terminal Management System
TMO	Traffic Management Office
TOPS	Transportation Operational Personal Property Standard System
TRAC2ES	TRANSCOM Regulating and Command and Control Evacuation System
TRAMS	Transportation Automated Management System
TRANSCOM	Transportation Command
UPC	Universal Product Code
USA	United States Army
USN	United States Navy
USTC	United States Transportation Command
USTRANSCOM	United States Transportation Command
USTRANSCOM COOP SITE	United States Transportation Command Continuity Of Operations Plan Site
USTRATCOM	United States Strategic Command
VT	Virtual Terminal
WPS	Worldwide Port System

Appendix C

Instructions for Requesting User IDs for GTN

1. Requests for GTN access must be **submitted on unit letterhead and signed by the commander.** Mandatory entries for all requests are as follows:

   a. Justification: How will system be used?

   b. Detailed information for each user:

      *Rank/Name

      *Complete Mailing Address:

      *Service:

      *Major Command:

      *If FPO/APO, Country/Country Code:

      *DSN:

      *Com:

      *DSN Fax:

      *E-mail Address:

      *Security Clearance:

      *Printer: (USTRANSCOM Only)

2. All requests for GTN access must have the information listed above. You may fax your requests to (DSN 576-6460) USTRANSCOM/GTNPMO-R ATTN: Judy Fowler or mail to USTRANSCOM/GTNPMO ATTN: Judy Fowler, 508 Scott Dr, Scott AFB, IL 62225-5357.

3. Your account will be subject to yearly validation. If you do not access your GTN account every six months, your account will be locked out.

4. GTN System Administrators will mail GTN User IDs and passwords to each user. If you don't receive your account information 10 working days after you've submitted your request, please call DSN 576-2875 to inquire.

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Vita

Captain James M. Miller graduated from Saint Martin's College in Lacey, Washington on 28 April 1984 with a Bachelor of Science in Mathematics. On 7 November 1984 he received his commission through Officer's Training School and moved to Reese AFB, Texas to attend Undergraduate Pilot Training. Captain Miller graduated from pilot training on 1 November 1985 and continued at Reese as a T-38 instructor pilot. In November of 1989 he moved to McChord AFB, Washington to fly the C-141. He flew many missions in support of Operation Desert Shield, Desert Storm, Provide Comfort, Fiery Vigil, and Restore Hope gaining invaluable experience in crisis response. While at McChord, Captain Miller graduated from the University of Denver's McChord extension with a Master of Science in Systems Management. In November of 1993, Captain Miller moved to March AFB, California to fly the KC-10 as one of the original pilots selected in the Mobility Enhancement Crossflow Program. In July and August of 1994, he found himself again in the desert supporting Operation Southern Watch helping enforce the no-fly zone over Iraq. In January 1995, he moved to McGuire AFB, New Jersey to attend Air Mobility Command's first class in the Advanced Study of Air Mobility. Captain Miller has a follow-on assignment to Ramstein Air Base, Germany serving with the United States Air Forces in Europe's Air Operation Squadron as a Contingency Mobility Planner.

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Visibility of assets within the Defense Transportation System has always been a challenge for the Department of Defense (DoD). The United States Transportation Command (USTRANSCOM) is DoD's lead agency for establishing Intransit Visibility. In its effort to establish Intransit Visibility, USTRANSCOM developed the Global Transportation Network, which acts as a central repository for transportation information. This will enable USTRANSCOM to collect information about cargo and passengers at their points of origin, and to track their movement through each node of the transportation network. In order to simplify the communication process within the network, USTRANSCOM has initiated several improvements: a reduction in the number of computer systems that process transportation information; data standardization to promote compatibility between these systems; simplification of the Defense Transportation Regulation; and standardization of Electronic Data Interchange transaction sets. These modifications will ease the difficulty of obtaining visibility information and facilitate the development of the Global Transportation Network.

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AFIT RESEARCH ASSESSMENT

The purpose of this questionnaire is to determine the potential for current and future applications of AFIT research. **Please return completed questionnaire** to: DEPARTMENT OF THE AIR FORCE, AFIT/LAC BLDG 641, 2950 P STREET, WRIGHT-PATTERSON AFB OH 45433-7765 or e-mail to dvaughan@afit.af.mil or nwiviott@afit.af.mil. Your response is **important.** Thank you.

1. Did this research contribute to a current research project? a. Yes b. No

2. If you answered YES to Question #1, do you believe this research topic is significant enough that it would have been researched (or contracted) by your organization or another agency if AFIT had not researched it? a. Yes b. No

3. The benefits of AFIT research can often be expressed by the equivalent value that your agency received by virtue of AFIT's performing the research. **Please estimate** what this research would have cost in terms of manpower and dollars if it had been accomplished under contract or if it had been done in-house.

Man Years__________ $__________

4. Whether or not you were able to establish an equivalent value for this research (in Question 3), what is your estimate of its significance?

a. Highly Significant b. Significant c. Slightly Significant d. Of No Significance

5. Comments (Please feel free to use a separate sheet for more detailed answers and include it with this form):

____
Name and Grade

____
Organization

____
Position or Title

____
Address