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THE IMPORTANCE OF IN-TRANSIT VISIBILITY ON THE U.S. MILITARY LOGISTICS

By

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The Importance of In-Transit Visibility on U. S. Military Logistics

INTRODUCTION

Just as Abraham Maslow presented a hierarchy of human needs from survival to growth, military logistics mirrors this building block approach to satisfying certain basic needs before more advanced facets of military strategy and doctrine can be formulated. The basic survival needs begin with physiological and safety needs. Food, water, shelter, materiel, and security requirements must be met in order to sustain and equip military forces. Next, troops are organized and trained, meeting psychological acceptance and esteem needs. Then, growth needs can be addressed, presenting opportunities to reach individual and group self-actualization. At this time, a military can begin to strategize and reach its full organizational potential. Therefore, basic needs must be satisfied before cognitive thought and successful vision can be played out on the field of battle.

The ability to see and act upon developing circumstances creates the importance of acquiring and acting upon such vision. The ability to see and track supplies and people is pivotal in the military decision-making process. In-Transit Visibility (ITV) is the ability of military commanders to access real-time information of units and shipments entering a theater of operations during times of peace and war. Historian Stanley Falk describes logistics on two levels. Logistics, on the immediate level, is the moving, supplying, and maintaining of military forces, and, on the strategic level, is the economics of warfare. "Today, combat support focuses on the rapid movement and sustainment of tailored force packages to conduct military operations anywhere in the world." (AFDD 2-4, 1999, 1) ITV embraces the immediate level of military logistics and combat support.

A look at the past, present, and future of ITV presents the optimal format when examining this important aspect of military logistics. First, an examination of the history of the logistics of war provides the foundation of the need for ITV. Next, this history presents an opportunity to discuss the background for the U. S. Defense Transportation System (DTS), which focused on combat support. Then, current logistical systems identify the infancy of ITV and agile combat support in the Global Transportation Network (GTN). As current systems look forward, the transformation of combat support then begins to unfold into a responsive, near real-time function of focused logistics for our future forces. "Focused Logistics is the ability to provide the right personnel, equipment, and supplies in the right place, at the right time, and in the right quantity, across the full range of military operations." (JV2020, 2000, 24) Finally, critical analysis of automatic identification technology (AIT) and system standardization will expedite this transformation and focus U. S. military's joint vision.

HISTORY

A brief overview of military history from the beginning of mankind, through centuries of war, with a closer look at the historical examples of Alexander the Great, Napoleon Bonaparte, and William Tecumseh Sherman, will demonstrate the maturation of military logistics through the beginning of the Industrial Age. An understanding of this history offers a snapshot of their actions and potential lessons learned. Although ITV is a modern concept, its principles are present in an evolutionary manner throughout this historical discussion.

Mankind began its existence concentrating on basic survival needs. Food, water, and shelter were unrivaled priorities. Thus, man's unconscious first thoughts were logistical in nature. Water provided a natural resource to answer basic physiological needs.   Besides

quenching thirst, various food sources, such as plants, fish and animals, were also present near water. Since these earliest thoughts and actions required the simplest of solutions, remaining near water satisfied hunger and thirst. Shelter and safety were also essential to survival. Water could, therefore, nurture trees to provide shade from the sun and cover from adverse weather, while creating a natural barrier from adversarial dangers. These same trees provided primitive weapons for hunting and protection. Sometimes shelter was high above or far away from water. However, for the reasons stated above, early man predominantly stayed near water and served as his version of ITV, consisting of line of sight logistics to satisfy his basic needs. As danger from both creatures of prey and others, seeking new territory to hunt and reside, presented emerging security threats, movement and flight usually was close to these resources. Thus, rivers, seas, and oceans became popular routes of travel and are known today as the littoral waters of sea lines of communication (SLOCs).

Jumping forward from prehistoric clans to armies of ancient times, they massed and fought not only for survival, but to conquer new lands. Logistics often spelled the difference between victory and defeat on the battlefield. "As early as 500 BC, Sun Tzu Wu referred to logistical functions and their relationships with strategy and tactics. The armies of Sun Tzu Wu's time lived off the land or brought with them whatever supplies they required. Consequently, logistics was accomplished without a great deal of preplanning." (Scott, 2000, 3) These simplest of supply methods were limited to what seasonal resources were available throughout an army's travels or what a soldier or pack animal could carry. ITV, therefore, continued as an unconscious afterthought.

"Alexander the Great was perhaps the first to develop a logistics system to support his Macedonian troops. His staff officers included quartermasters (QM) and subsistence officers

who supervised the army's baggage train, which was organized on the basis of one mounted

slave with a packhorse for each cavalryman and a slave on foot with a packhorse for every ten

infantrymen." (Scott, 2000, 3) Alexander integrated logistics concerns into his military strategy

and tactics. He had an acute awareness of his army's logistical requirements and would choose a

more circuitous route, predominantly staying near a coastline to facilitate resupply. "Because of

the limitations of transport, the army could not remain self-sufficient for long distances when

remote from navigable rivers and seaports." (Scott, 2000, 4) By opting to stay near SLOCs and

avoiding direct routes with negligible resources, Alexander's strategy normally chose known

logistical support paths with assured ITV throughout his campaign. He would also make

advance supply arrangements with surrendering local officials before entering their territory.

"Alexander considered the logistics implications of every aspect of the campaign, from the route

he took to the allies he courted, in successfully moving the Macedonian army across the

relatively barren deserts of Asia Minor." (Scott, 2000, 177) He would first obtain information

regarding the routes, climate, and resources of a targeted country, and then use a portion of his

army, as a light, less-burdensome force, to advance quickly upon his foes. He left large

garrisons of forces at key locations along his route of travel, ensuring allegiance from his

conquered, enabling cities to be depots for supplies, and protecting his lines of communication

(LOCs). Once again, this strategy satisfied basic survival needs and afforded Alexander the

necessary logistical support for his Macedonian Army. This advance intelligence afforded

Alexander a predictable awareness or ITV of military forces and supplies, enhancing his

successful military operations. Finally, Alexander understood the advantages of speed and

flexibility by using horses, camels, and mules versus oxen, donkeys, and wagons, while limiting

followers or support civilians to reduce his baggage train or, as termed today, its logistical footprint.

Napoleon's "grand armee" added a new chapter to military logistics. His strategy to rapidly maneuver "en masse" created a new paradigm. "Napoleon regained mobility not by revolutionizing supply but by abandoning sterile siege warfare." (Lynn, 1993, 11) He abandoned the magazine concept of supply, which required defense and restricted the speed and mobility of an army. "Bonaparte's attention to logistics was extraordinary, and it was predominantly his preplanning and respect for support factors that allowed him to move and maneuver with such stunning agility." (Scott, 2000, 3) He tended to immerse himself in every aspect of campaign planning and this self-reliance initially proved successful on the battlefield. "Modern forces, however, were enormous in size and made demands in subsistence, ammunition, and replacements on a scale that was more enormous still." (Van Creveld, 1977, 75) Napoleon's technologically superior army included heavy guns with multiple horse teams. Logistical challenges were vulnerable to oversight if the requirements of his army were miscalculated. His victories in Western Europe consisted of concentrated rapid movements of his large army. However, Napoleon's success ended in 1812 with his invasion of Russia. The burden of conducting a war on two fronts and unanticipated tactics by the Russian army highlighted errors in Napoleon's static logistical considerations in preparation for this unsuccessful undertaking. "Logistical problems played the pivotal role in Napoleon's failed campaign into Russia. Inadequate transportation systems, reliance upon single sources of replenishment, and improper provisioning for extremes in climate reduced the greatest army of the time, some 250,000 men strong, to a feeble force of 8,000 survivors. Napoleon's wagons were well suited for the relatively passable roads of Western Europe, but were woefully

inadequate in the boggy mire of the Russian countryside." (Scott, 2000, 181) His reliance on Smolensk supply depot in Poland as the sole source of replenishment and his underestimation of the Russian winter proved fatal to his army. Napoleon's poor planning, unanticipated logistical shortfalls, and failure to perceive the importance of basic survival needs could have been foreseen with adequate ITV. Napoleon's advance into Russia failed to recognize the ever-lengthening, yet increasingly inadequate logistical tail.

General William Sherman addressed the importance of ITV in his approach to military logistics. He used a strategy that emphasized maneuver and focused on logistics. On his campaign to Atlanta, he assigned troops to protect his supply chain by acquiring and maintaining rail transportation from his Nashville supply depot to his front lines. Sherman's philosophy of protecting rail lines through decentralized execution by functional experts afforded him the ability to oversee the flow of supplies to the front without directly involving himself in the minutia of day to day rail operations. "Sherman's strategy and tactics in terms of logistics were then clear: a highly mobile force that would rely upon significant logistics support from the rear; whenever this support was interrupted, whatever was required would be taken from the local inhabitants." (Scott, 2000, 182) His brilliant use of combat support led to the capture of Atlanta, Georgia in September of 1864. "It was the first example of true strategic logistic surprise in the railway era and has been seen by some commentators as setting the example for future deep penetration exploits in motorized operations of the 20th century." (Macksey, 1989, 22) He continued his campaign through Savannah and north into South Carolina by undermining the Confederate Army's basic survival needs. "William Tecumseh Sherman was one of the Union Army's leading generals during the U. S. Civil War. With an army of 62,000, he began his famous March to the Sea. His intent was 'to make Georgia howl' by destroying crops in a wide

path to Savannah. Sherman did not attack an army-he was almost unopposed. Instead, he attacked the South's ability and will to fight." (Grolier, 2000, 17-150) He had his troops forage and carry ten days provisions. Sherman's strategy of leading a raiding column to decimate Georgia gutted the Confederate Army's logistical resources and its ability to wage war. Sherman's adequate supplies and maneuverability overwhelmed the Confederate forces and clouded their ITV, thus destroying the South's logistical resupply capability.

BACKGROUND

"Defense transportation was originally managed individually, by three Services, through their own Transportation Component Commands (TCCs): the Army's Military Traffic Management Command (MTMC), the Navy's Military Sealift Command (MSC), and the Air Force's Air Mobility Command (AMC)." (Geis, 1999, 1) Multiple transportation modes were used in the 1978 worldwide deployment exercise NIFTY NUGGET, which revealed inflexibility within DTS. "Most of the history of U. S. defense transportation has been marked by disunity of effort. Only since 1987 with the creation of US Transportation Command (USTRANSCOM) has this situation been rectified. USTRANSCOM is the single manager for air, land, and sea transportation for the DOD, both in time of peace and war. It determines the best mode of transportation a request should be levied against, tasks the appropriated TCC, and monitors the mission until completion." (Todd, 1998, 3)

To improve unity of effort within the U. S. military, Congress enacted the Goldwater-Nichols DOD Reorganization Act of 1986 (GNA). Two of the objectives of the GNA were to provide for the more efficient use of resources and enhance the effectiveness of military operations. (Locher, 2001, 463) In response to the GNA, United States Transportation

Command (USTRANSCOM) was established in 1987 as DOD's single wartime manager for common-user lift, coordinating the movement of troops and materiel via military and commercial modes of transportation. In 1992, following dismal ITV during Persian Gulf War in 1990-1991, DOD designated USTRANSCOM as a unified command with functional combatant command authority over AMC, MSC, and MTMC. "As part of its mission, it created a transportation system that would provide ITV to all DOD transportation users throughout the world." (Sciaretta and Trettel, 2000, 73) ITV remains crucial to DOD transformation, particularly in relation to the expeditionary nature of current and future Joint Force Concept of Operations (CONOPS).

CURRENT PROGRAMS

DOD needs to identify and track item, unit, and personnel movements throughout the logistics pipeline. "In-transit visibility improvements are allowing the warfighters the ability to track cargo anywhere in the DTS, but this is still maturing. The Global Transportation Network (GTN) is the DOD system for ITV along with being USTRANSCOM's command and control system. Knowing where cargo and passengers are will allow USTRANSCOM to better utilize assets, reduce the amount of reordering and inventory levels by the users, conduct fluid movement of troops into the theater, and react much faster to meet the commander's rapidly changing needs." (AMC Point Paper, 1997, 3) "Currently, ITV is seen as watching shipments move throughout the transportation process by receiving 'real-time' updated shipment status of cargo, personnel, personnel property, and medical evacuations as they are being transported." (Geis, 1999, 7)

According to USTRANSCOM's website, GTN gives its customers, located anywhere in the world, a seamless, near real-time capability to access and employ transportation and deployment information. GTN is an automated command and control (C2) information system that supports the family of transportation users and providers, both DOD and commercial, by providing an integrated system of ITV information and command and control capabilities. GTN is accessed through the Internet's World Wide Web. "GTN is an integrated data base system that provides users with real-time in-transit visibility information, and command and control capabilities to facilitate transportation planning and decision making during all types of operations." (GTN Introduction & System Overview, Web Page, 1999) "GTN supports ITV by providing the ability to track the identity, status, and location of DOD unit and non-unit cargo, passengers, patients, forces, and military and commercial airlift, sealift, and surface assets from origin to destination. GTN collects, integrates, and distributes transportation information to permit earlier visibility into transportation requirements by obtaining visibility when it is initiated and continuing visibility as it moves through the transportation pipeline. ITV of DOD cargo moving commercially is captured through the electronic commerce and data interchange." (USTRANSCOM Handbook 24-2, 2000, 428)

According to Scott AFB's GTN website, the GTN system integrates data from numerous transportation and logistics information systems, both military and commercial, into one central repository, creating relationships between the flood of data and transforming the data into new, correlated useful information. Additionally, GTN provides worldwide accessibility to this reliable information over a secure web-accessible network – giving USTRANSCOM the capability to command and control the largest defense logistics system in the world. "GTN

collects data from source systems in an integrated database and provides ITV, C2, and business

operations' applications and information." (USTRANSCOM Handbook 24-2, 2000, 428)

The DTS encompasses an entire suite of assets and capabilities moving air, land, and sea

shipments of passengers and cargo around the world. A system of authorized users levy

requirements upon DTS and its diverse inventory of airlift, sealift, and traffic management

capabilities. Airlift, sealift, and overland shipments utilize military and commercial carriers.

"GTN currently receives ITV information from eighteen sources or systems, and that number is

expected to grow to 28. GTN compiles the information received from each system and takes the

most current and best information provided to create a single source system for customers to

access ITV information regarding their shipment status." (GTN Information Feeds, Web Page,

1998)

Transportation Coordinator's Automated Information for Movement System (TC-AIMS

II) provides a system for unit mobility, load planning, and installation transportation officers.

The Worldwide Port System (WPS) is DOD's single, standard common-user waterport

documentation and cargo accountability system. Global Command and Control System (GCCS)

is the primary joint system designed to fulfill the requirement for a capability to move forces

around the globe, providing the warfighter with planning, C2, and ITV necessary to achieve

mission accomplishment. TRANSCOM Regulating Command and Control Evacuation System

(TRAC2ES) is the newest system to be integrated into GTN. It provides ITV for patient

movement and tracking. These are four of the numerous systems that GTN must integrate in

order to give accurate ITV.

Systems integration is an ongoing process within GTN. Timely and accurate data inputs

are critical to ITV. If the components of GTN are fed inaccurate data, the system will not be

able to provide ITV. (Young, 1996, 18) Getting the status of requisitions is just one aspect of

GTN, how current the information is the other. (Geis, 1999, 43) Also, access to GTN

information is crucial to ITV. Currently, the GTN system is predominantly a World Wide Web

based system, which relies extensively on current capabilities of the Internet. (Tooker,

PHONCOM, 1998) Internal and external integration factors present some of the integral facets

of evolving ITV in military logistics. These data entry and integration challenges will be

discussed in later critical analysis.

FUTURE PROGRAMS

"Guided by *Joint Vision 2020*, USTRANSCOM's course hinges on three vital themes:

(1) readiness to support the warfighter; (2) preparing now to operate effectively in the 21st

century through modernization and continuous process improvements for increasingly effective

and efficient transportation; and (3) continued, dedicated focus on the needs of people and their

family." (USTRANSCOM Pamphlet 35-1, 2001, 6) Future ITV programs are needed to support

DTS's readiness, modernization, and continuous process improvement. USTRANSCOM is

committed to ITV enhancement through GTN modernization.

"A team led by Northrop Grumman Corporation's Information Technology (IT) sector

has received a six-year $63.8 million contract for the next generation information system that

will improve the ability to provide near real-time visibility of passengers and materiel moving

through the Defense Transportation Systems (DTS). Northrop Grumman IT will be providing

the initial operational capability of the Global Transportation System-21 (GTN-21) as part of this

exercised option awarded by USTRANSCOM." (Information Technology, 2002, 1) "According

to an article in Federal Computer Week, by providing the military with almost instantaneous

updates on the location of troops and supplies on the move, the USTRANSCOM's GTN 21 should help commanders make operational decisions faster. GTN 21 wraps the logistics systems of the armed services and defense agencies (along with commercial carrier information) into one integrated database. An effort is also under way to link GTN 21 to the transportation information technology systems operated by the Defense Department, including the Air Force's Cargo Movement Operations Systems (CMOS) and those operated by civilian transportation companies. CMOS monitors passengers and cargo to increase ITV from home bases to the trenches." (ITSA, 2002, 1) Civilian companies transport contract shipments of people and materiel.

GTN 21 is scheduled for full operational capability in 2006. It will enhance current legacy GTN capability with user-friendly functionality, improved C2 to support warfighter decisions, and an active data warehouse with two years of historical data. GTN 21 will support and expand upon current customer application systems by doubling processing capability. It will address the urgent need for more reliable ITV capability to accomplish current and future dynamic operational missions.

"Joint Vision 2020 states that focused logistics will 'be made possible through a real-time, web-based information system providing total asset visibility as part of a common relevant operational picture, effectively linking the operator and logistician across Services and support agencies.'" (Hodge, 2001, 1) "Total Asset Visibility (TAV) is comprised of in-transit, in-process, and in-storage visibility." (Manzagol and Brown, 1996, 8) GTN 21 supports DOD's Joint Total Asset Visibility (JTAV) Program. JTAV facilitates the capability to act upon timely and accurate logistics information to improve DOD's overall performance. It is a data sharing

system that clarifies data, improves warfighter planning and strategy, and supports GNA objectives.

From prehistoric times through current programs into future endeavors, ITV maintains its importance on military logistics. U. S. military logistics requires ITV to succeed at all levels of war. "Logistics is the science of planning and carrying out the movement and maintenance of forces. The relative combat power that military forces can bring to bear against an enemy is enabled by a nation's capability to plan for, gain access to, and deliver forces and materiel to the required points of application across the range of military operations." (JP 4-0, 2000, I-1) The GTN through ITV collects, integrates, and distributes transportation information to combatant commanders for use in their military planning and operations.

CRITICAL ANALYSIS

The question of whether to innovate future military systems or replicate emerging commercial ones leads to an analysis of two aspects of the evolution of ITV in U. S. military logistics. AIT and system standardization present two arenas to answer such a question. Each area will be discussed with an additional concluding comment on their interrelationship.

DOD AIT Implementation Plan establishes a set of data timeliness reporting criteria. "Historically, commanders have faced two major problems in the force projection process. One, they had limited or no real visibility of what units were in the force projection pipeline or when these units would reach the area of operations (AOR). Two, because of the lack of visibility, commanders had no efficient method of redirecting movements or shipments as the operational situation developed. Additionally, in previous operations many commanders at the company level did not understand the reason or importance of ensuring their unit deployment lists (UDLs,

also known as deployment equipment lists – DELs) were accurate and that AIT data storage

devices were properly attached to all deploying equipment. The lack of visibility resulted in a

loss of confidence by commanders at all levels in the ability of the transportation and other

logistics systems to effectively support their operations." (AITG, 2000, 3-6)

"Civilian-sector efficiency improvements result from rapidly increasingly use of

technology to identify, track, and quickly locate cargo and shipments." (Brown, Archive,

Website) Commercial shipment identification through bar codes and microchip identification

(ID) tags are becoming commonplace, providing real-time information. "DOD is also making

extensive use of AIT to track the movement of ammunition, equipment, and sustainment supplies

through DTS. These applications are an adaptation of commercial technology to a military

problem. (Brown, Archive, Website) Since AIT is widely accepted facet of commercial

transportation and inventory systems, U. S. military logistics would be best served by using

existing and emerging commercial AIT. As stated in the current programs section, data

inaccuracy degrades ITV. Human input, either at origin during initial ID or in-transit, may lead

to intentional and unintentional ITV errors.

"AIT is any technology that automates the collection of data and transfer of that data to a

database. AIT gains are greater speed (productivity), accuracy, system integrity, reduced

paperwork, and greater information. Examples of AIT include bar-coding, magnetic strip cards,

computer-chip memory buttons, radio networks, and portable computers for immediate on-site

data input." (AFCESA, 1994, 1) Bar codes and radio frequency (RF) AIT are commercial off-

the-shelf (COTS) technologies. Bar codes would most likely need to be two dimensional, thus

allowing the corresponding database to contain the necessary military logistical data. RF AIT,

currently being used in DTS, provides valuable ITV data through RF energy. Both technologies

require readers or interrogators, either fixed or portable; however, RF AIT uses a power source (battery) to transmit, while bar codes need to be visually scanned.

Both AITs and any emerging follow-on upgrades reduce data input opportunities and best serve current ITV and JTAV initiatives within the military logistical system. Two-dimensional bar codes should be considered as an established passive ITV source, however, coding would require a wholesale changeover from today's single bar codes. "The radio frequency (RF) tag system appears to be the most versatile AIT." (Johnson, 1998, 2) "Throughout the deployment and redeployment process, AIT interrogator/reader devices will be located at installations, transportation nodes, staging areas, and designated transit points." (AITG, 2000, 3-15) "Handheld scanners, radio frequency identification (RFID) hardware, software and services, and numerous other cargo and vehicle tracking systems are being fused together to present Army leaders with a detailed, graphical view of not only what supplies are in what containers at the camps, but also where they are throughout their journey to the front lines, said Maj. Forrest Burke, chief of logistics information management here (Camp Arifjan, Kuwait) for the Coalition Forces Land Component Command." (Caterinicchia, 2003, 1)

Globally, there are numerous transportation related automated systems. Current DTS operating systems, C2, and AITs with non-standard applicability negate ITV within the U. S. military logistical structure. Each requires unique inputs to produce viable data for a combatant commander. Commercial transportation systems integrate logistical data into a single system. USTRANSCOM utilizes the Single Mobility System (SMS) as a web-based computer system that provides ITV of air, land, and sea lift assets and provides aggregated reporting of passenger and cargo movements. However, SMS collects movement data from other varied computer systems to achieve this common logistical picture. Therefore, GTN 21 appears to be just a

follow-on system integrator. A standardized operating system with coordinated service and defense agency training would facilitate JTAV.

Integrating information from different global systems presents contextual challenges. Identification differences are exemplified in the following example. "The project called Vendor ITV III (VITV III) added the ability to track repair parts, subsistence commodities, medical surgical supplies and pharmaceuticals that are being shipped direct from the vendor. This capability allows you to see those items acquired directly from a commercial vendor and shipped to its final destination, with the possibility, that the shipment may never enter the DTS. The uniqueness of tracking an item being shipped directly from a vendor is there may not be a Transportation Control Number (TCN) associated with the shipment. Instead Commercial Product Ids are used and may include the Universal Product Code, the Universal Product Number or the National Drug Code." (GTN Update, 2003, 3) Format, inter-database, and attribute naming differences may also arise when integrating systems. "Furthermore, the TAV required by FY04 does not seem achievable by that date as data systems for each of the major logistics functions, supply, maintenance, transportation, and acquisition are not linked." (Ramer, 2002, 28)

"The advent of intelligent transportation systems (ITS) has resulted in the rapid widespread adoption of a wide range of technologies to aid transportation. They include the use of wireless communications, radar, sophisticated computer-aided video detectors, and on-board computer and vehicle navigation systems, all leading to the evolution of an integrated and multimodal transportation concept enabled by technology. ITS may affect military transportation in many ways. The same technology being developed to support commercial vehicle operations, including the use of automatic vehicle location, automated maintenance

monitoring, computer-aided dispatch, and improved scheduling and routing, could be applied to aid the military in fleet management. Traveler aid technologies could be used to manage operations of a base or port or to improve convoy operations. The use of ITS standards by the military has the potential of supporting interservice interoperability and ensuring compatibility with civilian traffic management and vehicle dispatch systems." (Brown, Archive, Website) Existing and emerging commercial systems afford DTS its optimal chance at achieving ITV.

The interrelationship of AIT and system standardization is best captured in their integration with satellite technology. Satellites already perform tracking and communications functions for the U. S. military. Their presence is almost guaranteed in an active AOR. In today's flexible, asymmetric military operations, satellite tracking of RF AIT can be fed into a SMS or ITS to assist in planning, employing, and sustaining military forces. Commercial trucking firms are already exploiting current satellite tracking technology. Once again, COTS applications provide commercially tested departure points to achieve ITV in U. S. military logistics.

CONCLUSION

Since the beginning of time, historical examples of military logistics reveal ITV's importance. "The success of Alexander' expedition, the longest military campaign ever undertaken, was in no small part due to his meticulous attention to the provisioning of his army." (Engels, 1978, 3) Since the establishment of USTRANSCOM, DTS has experienced an increasingly unified effort to improve ITV. Military planning and strategy is best accomplished when logistics is considered. "Strategically, logistics capabilities may limit the deployment, concentration, and employment options available to the NCA, Chairman of the Joint Chiefs of

Staff, or combatant commanders. Operationally, theater logistics constraints may dictate the rate of strategic buildup or theater onward movement, overall size of the combat force, depth of any attack, or the speed of advance." (JP 5-00.2, 1999, VIII-4)

Current DTS programs use GTN to improve ITV. "Timely, complete and accurate data in GTN, Jones (Lori Jones, civilian chief of logistics operations at USTRANSCOM) said, is critical to making informed decisions about the onward movement and sustainment of the force. (Smith, 2002, 2) Naturally, future DTS programs will apply new logistical systems to feed the developing GTN 21. Theoretically, GTN 21 will push ITV toward JTAV. Next, DOD's employment of AIT improves data capture at the supply source and follows shipments and movements through interim portals to their destinations. Finally, the proposed system standardization and robust employment of satellite technology will enhance ITV.

ITV is the ability to track the identity, status, and location of assets from origin to destination (AFDD 2-4, 1999, 27) "Although logistics, the art of supplying and moving armed forces, do not possess the drama of battle, they underlay strategy and determine victory or defeat. As the old axiom goes, 'Amateurs study tactics; professionals study logistics.'" (Lynn, 2000, 1) The importance of ITV in U. S. military logistics is best served by perusing the past, performing (and analyzing) in the present, and, then, preparing for the future.

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