Department of the Army
Pamphlet 700–85

Logistics

Automatic Identification Technology (AIT) Integration Guide

Headquarters
Department of the Army
Washington, DC
27 December 2000

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SUMMARY of CHANGE

DA PAM 700–85
Automatic Identification Technology (AIT) Integration Guide

This new Department of the Army pamphlet--

- Explains the Army’s Total Asset Visibility vision as it relates to Automatic Identification Technology and the operational environment. (Chaps 3 and 4)

- Provides guidance for the use of Automatic Identification Technology in tactical Combat Service Support operations. (Chaps 5, 6, 7, and 8)

- Provides guidance for the use of Automatic Identification Technology at the operational and strategic levels. (Chaps 9, 10, 11, 12, and 13)

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Automatic Identification Technology (AIT) Integration Guide

By Order of the Secretary of the Army:

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History. This publication is a new Department of the Army Pamphlet.

Summary. This pamphlet provides strategic, operational, and tactical level information of the implementation of automated identification technology (AIT) doctrine. This technology supports Army Service Component Commanders (ASCC), Army forces commanders, and other service leaders and their staffs employed in joint, combined, or interagency tasking across the spectrum of military applications. This pamphlet implements relevant procedures from the Department of Defense (DOD) publications and joint doctrine. It is fully compatible with the Army's operations doctrine as contained in FM 100-5, FM 100-7, and FM 100-16.

Applicability. This pamphlet applies to the Active Army, the Army National Guard of the United States (ARNGUS), and the US Army Reserve (USAR). During mobilization, procedures in this publication can be modified to support policy changes as necessary.

Proponent and exception authority. The proponent agency for this pamphlet is HQDA (DALO-PLI). The proponent has the authority to approve exceptions to this pamphlet that are consistent with the controlling law and regulations.

Suggested Improvements. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Director, US Army Logistics Integration Agency, ATTN: LOIA-LS, 5001 Eisenhower Avenue, Alexandria, VA 22333-0001 or send comments on the electronic DA Form 2028 when viewing this pamphlet over the internet.

Distribution. This publication is available in electronic media only and is intended for command levels A, B, C, D, and E for Active Army, Army National Guard of the United States (ARNGUS), and U.S. Army Reserves (USAR).

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Glossary

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Part One
General

Chapter 1
Introduction

1–1. Purpose
This pamphlet provides strategic, operational, and tactical level information on the implementation of automated identification technology doctrine. This technology supports ASCCs, Army forces commanders, and other service leaders and their staffs employed in joint, combined, or interagency tasking across the spectrum of military applications.

1–2. References
Required and related publications and prescribed and referenced forms are listed in appendix A.

1–3. Explanation of abbreviations and terms
Abbreviations and special terms used in this pamphlet are explained in the glossary.

1–4. Background – Army Vision 2010
a. Army Vision 2010 is the descriptive document that sets the course for what the Army must do to have the Ability to Conduct Prompt and Sustained Operations on Land Throughout the Entire Spectrum of Crisis. Army Vision 2010 identifies operational imperatives and enabling technologies, which are needed to help the Army achieve Full Spectrum Dominance.

b. One of the central tenets of Army Vision 2010 is "Sustaining the Force through Focused Logistics." At the time and in the quantities required, Focused Logistics should predict requirements for support and rapid movement of that support to the precise location or unit. The capability to focus logistics is composed of a number of components. Prominent among these is Army Total Asset Visibility. Automatic Identification Technology (AIT) is a component of total asset visibility that serves as the means for acquiring source data automatically.

c. The Army began developing the capability to provide advance notification of surface and air movements through automatic means. These included: In-transit documentation and visibility of items and units from origin to destination, inside the box visibility to the level of document number (contents of containers, contents of multipacks, contents of air pallets), national stock number (NSN), and quantity to the receiver at any point in the distribution pipeline. The initial focus was on devices that respond to queries about the data that they carry.

d. A number of devices have begun to proliferate throughout the distribution system. The applications to which they are being applied are increasing at a rapid pace, in tandem with the technology of source data automation. More recent efforts have been applied to linking source data automation with the management information systems. This linking continues apace with technological development.

e. The Army continues to work on building the capability to capture deployment data, monitoring of what is happening at every node, as well as in-transit, and location reporting linked to command and control systems.

f. The Army is close to achieving its early developmental objective of Army Total Asset Visibility (ATAV). The continuing developmental focus is Real Time Awareness—real time awareness of the entire distribution pipeline, personnel, units, weapons system readiness, system performance (meaning the ability to make immediate adjustments, reposition, redirect, and measure how well requirements are being met). To do all of this requires access to central data bases for queries for major and secondary end items and medical materiel, repair parts at retail and National levels, munitions, clothing and other troop support items, as well as Defense-level managed and owned items (Defense Logistics Agency and other Services). Other information requirements include obtaining mobility and platform (aircraft, surface transport) status.

g. The linkage of Army Total Asset Visibility to Command and Control systems and intelligence systems promises to provide all management levels a more complete situational picture than heretofore was possible. The emphasis has shifted to speed, access, data accuracy, and availability. The principal procedural, process, and technological innovations occur in these areas.

h. With these factors in mind, the Army Total Asset Vision for 2010 may be stated as: Army Total Asset Visibility is the fusion of information technology, Army Standard Information Management Systems, centralized data, AIT, and reengineered management processes and practices that form the heart of Focused Logistics. Focused Logistics provides operations that deliver the right materiel, at the right time and the right place, and in the right quantities to support soldiers.

Chapter 2
Duties

2–1. Duties of the Department of the Army Deputy Chief of Staff for Logistics, (DA DCSLOG).
Develops, supervises, and implements AIT applications into Army logistical automated information systems, including supply, maintenance, transportation, and readiness, troop support, and energy.

2–2. Duties of the Directorate for Plans, Operations and Logistics Automation, (DA DCSLOG).
Coordinator and provides priorities and planning, programming, budgeting and execution oversight of AIT initiatives.

2–3. Duties of the Directorate for Transportation and Troop Support, (DA DCSLOG).
Provides transportation and strategic mobility input to AIT development in support of mobilization, deployment, redeployment, and demobilization policy and doctrine. Functions as DCSLOG point of contact for transportation automated information systems and associated AIT.

2–4. Duties of the Directorate for Supply and Maintenance, (DA DCSLOG).
Provides supply and maintenance input to AIT development initiatives in supply, maintenance, and integrated logistic support missions such as Battlefield Distribution (BD). Functions as DCSLOG POC for supply, maintenance and ammunition automated information systems and associated AIT.

2–5. Duties of the United States Army Logistics Integration Agency (USALIA).
Develops concept plans for employment; plan for integrating AIT into logistical Automated Information Systems (AIS) and prepares handoff plans for approved plans for Army implementation.

2–6. Duties of the United States Army Combined Arms Support Command (USACASCOM).
As the combat developer, provides for the Army's automation requirements for tactical (retail) logistics and doctrine, organizations, training, leader development, materiel and soldiers (DOTLMS). In this capacity, USACASCOM provides for the BD doctrine, which AIT supports through the logistical STAMIS. USACASCOM determines the AIT organizational requirements (Basis-of-Issue-Plans, (BOIPs)), and develops and issues AIT application doctrine, tactics, techniques, procedures, and training.

2–7. Duties of the United States Army Materiel Command (USAMC).
Provides for the Army's automation requirement for strategic (wholesale) logistics. The USAMC determines the AIT organizational requirements, develops and issues AIT application doctrine, tactics, techniques, procedures, and training for wholesale logistics.

2–8. Duties of the Office of the Director of Information Systems for Command, Control, Communications and Computers (DISC4).
Provides for enforcing Army systems architectural and technical standards.

2–9. Duties of the Program Executive Office - Standard Army Management Information Systems (PEO-STAMIS).
Provides for acquisition, implementation, and integration of technologies such as AIT into current and/or emerging STAMIS such as the TC AIMS II.

2–10. Duties of the Product Manager, Automatic Identification Technology (PM AIT).
Provides DOD and other non-DOD agencies with centralized product procurement and management services to support AIT.

2–11. Duties of the Project Office, Tactical Management Information Systems (PO TACMIS).
Provides the logistical readiness and distribution of AIT equipment.

Part Two
Army Total Asset Visibility — Vision

Chapter 3
Army Automatic Identification Technology

3–1. Introduction
a. The AIT, is one of the keys to obtaining accurate and timely information on the status of assets, whether in-

storage, in-process, or in-transit. The AIT is a suite of tools for facilitating data capture, aggregation, and transfer of asset data. The strength of AIT is that with minimal human intervention, it is possible to rapidly capture detailed information and interface with AIS.

b. The AIT includes a variety of read and write data storage technologies that are used to process asset identification information. These technologies include bar codes, magnetic strips, integrated circuit or "smart" cards, optical memory cards (OMC), radio frequency (RF) identification tags, and magnetic storage media. They are used for marking or "tagging" individual items, multipacks, unit equipment, air pallets, or containers. The AIT also encompasses the hardware and software required to create the devices, read the information, and integrate that information with other logistics information. The AIT offers a wide range of data storage capacities, from a few characters to thousands of bytes. The information on each AIT device can range, for example, from a single part number to a self-contained data base. As AIT devices are interrogated, the information contained within them is fed electronically into AISs to update status records. The ability to provide secure operations must be a fielding consideration in all applications of AIT devices.

3–2. Overview

The purpose of the AIT application is to provide economy, efficiency, and effectiveness throughout the global logistics network. This strategy defines AIT and its logistical applications and lays out a management approach that supports future Army AIT applications. In addition, it supports the Department of the Army AIT Concept of Operations (CONOPS), which focuses primarily on joint operations, interoperability, and standardization. The Army AIT CONOPS provides the vision to integrate existing and new technologies and use those technologies to support future logistics operations. Because no single AIT device can satisfy the Army's logistics requirements, the Army embraces a family of AIT devices.

3–3. AIT devices

a. AIT devices. The AIT devices enable the Army's architecture to better support the DOD objective in logistics. These devices enhance the visibility and control of assets during the logistical process—from the identification of cargo to receipt by the user. Some AIT devices use radio frequency as the method of communicating data to automation information systems.

b. Radio Frequency Identification System (RFID). The RFID equipment supports the function of Total Asset Visibility for the movement of material. The RFIDs main purpose is to provide stand-off "in-the-box" visibility of container contents as well as in-transit visibility (ITV) of the container and its contents. The use of RF tags and interrogators (Hand Held or Fixed) identifies cargo and monitors the movement from point of origin to port of embarkation (POE) to port of debarkation (POD) to theater nodes. At the depot or distribution terminal, air pallet and container content data is written to the RF tag by radio frequency or docking station and the tag is attached to the container/pallet. Omni-directional interrogators, installed at key transportation and supply nodes, read the tagged containers as they arrive and depart those nodes. The interrogators pass data to a regional server in support of the ATAV program. Logisticians with Internet access or password access to ATAV can access the data.

c. Bar codes. A bar code is an array of parallel, narrow, rectangular bars and spaces that represent a group of characters in a particular symbology. The bars and spaces are arranged in an order defined by the symbology. Bar codes are applied on labels, paper, plastic, ceramic and metal by a variety of marking techniques. A reader scans the bar code, decodes it, and transfers data to a host computer. Linear bar codes provide item identification and document control information for individual items and shipments. Vendors attach linear bar codes to all items of supply (either directly on the items or their exterior packs). The bar codes identify the part item number and support entry into the Army's supply system. In addition, Army supply sources, such as maintenance facilities and storage sites, attach linear bar codes to all shipments (for example, DD Form 1387, Military Shipping Label) to support transportation and item release receipt documents (for example, DD Form 1348-1A, Issue Release/Receipt Document). These documents provide bar coded transportation control movement document (TCMD) information as well as consignee and item number data. Each node in the logistics pipeline must be capable of reading linear bar codes to support local processing requirements, such as receipt, shipment consolidation, or maintenance. A new and evolving standard for bar coding employs what is termed two dimensional bar-code symbology. The 2D bar code incorporates marking in the vertical and horizontal plane to allow for more data encoding. The 2D bar code is more robust than the linear bar code, holding more data and providing a higher degree of data survivability if damaged. The DOD is currently pursuing the portable data file (PDF) 417 format for 2D applications. The PDF 417 is a stacked symbology, the symbology consisting of 17 modules each containing 4 bars and spaces (thus the number "417"). The code is in the public domain. The structure of the code allows from 1,000 to 2,000 characters per symbol. Each symbol has a start and stop bar group that extends the height of the symbol. The 2D bar-coded items may contain supply and transportation information on a single label.

d. Optical memory card. The OMC is a data storage device that resembles a credit card and has the capacity to store data equaling 1,200 typewritten pages. Information is stored digitally on the card in binary code. Virtually any information that can be digitized can be stored on a laser card. The card has a nonvolatile and environmentally tolerant memory, and is impervious to magnetic or electrostatic fields. The card can be continuously updated with new information until the memory is full and is nonerasable. The DOD components would use OMCs when significant

content detail is required, such as for multipack, air pallet, container, trailer, and railcar shipments. The OMC cards contain both supply (requisition) and TCMD data and enhance receipt processing of multipacks and air pallets.

e. Smart card. A smart card is a credit card-size device that contains one or more integrated technologies, bar code, and magnetic strip automated reader technology that stores various pieces of information about the holder of the card. The card can contain demographic, medical, training, and various other personnel/personal information about that individual.

f. Electronic data interchange. The electronic data interchange (EDI) is the exchange of data from common business documents using standard data formats from computer to computer. The EDI will enhance the capture and integration of source material data, provided by the vendor, into any Standard Army Management Information System (STAMIS) or other AIS.

3–4. Technological and business process changes

The AIT will improve Army logistics business processes and enhance its warfighting capability by facilitating the collection of initial source data, reducing processing time, and improving data accuracy. Future technological and business process changes will give the Army the capability to provide required visibility of equipment, resources and commodities that will enhance the concept of service support from "fort and factory to fox hole." The visibility concept, which continues to be the dynamic force behind AIT, is the push for lowering the stockpiles of supplies in the theater of operations and providing equipment and supplies faster to the supported commander in chief (CINC).

Chapter 4
Operational Environment

4–1. General

Army strategic, operational, and tactical commanders and their staffs must develop comprehensive support plans focusing on the capabilities and integration of joint, interagency and combined assets to achieve the desired operational effect and strategic results (FM 100-16). The availability of forces, materiel, information, and communication resources is the basis of comprehensive support planning and execution. Industrial capabilities are included increasingly in the planning scenarios as well, and affect logistics support to forces deployed around the globe. Linkages between all levels of strategic and operational planning are of paramount importance. The focus is on information dominance. Information dominance is the possession and application of superior information/communication technology, in support of strategic, operational, and tactical decisionmaking. In today's environment, commanders and their staffs are being provided an exceptional level of data and information from a vast array of sensors on weapon platforms. There are airborne, satellite, and ground-tracking systems for everything from engine performance to individual vehicles. Individual containers and their contents, as well as visibility within the portals, through which they transit, are tracked.

4–2. Concept of operations for AIT

a. CONOPS for AIT. The concept of operations (CONOPS) for AIT is the insertion of AIT into the DOD distribution system from the suppliers, (military and commercial) through the nodes and the transit points in the distribution system. The AIT application extends to the soldier, his equipment (personal and organizational), and his weapons platforms. The AIT is used virtually anywhere the requirement exists to capture data automatically that otherwise would require manual labor to capture and turn it into useable information. Figure 4-1 is a compendium of applications.

- Inside the Box Visibility-Contents
- In-Transit Visibility-Modes, Terminals, MHE, Facilities, (Floor or Warehouse)
- Serial Number Tracking-Weapons, High Priority, Sensitive Item, Personnel
- Receipt, Issue, Storage Processing (Packaging, Labeling, MHE, Inventorying)
- Unit Tracking-Personnel (Manifesting, Equipment-Tactical, Non-tactical, Patients)
- Equipment Status Reporting (Maintenance-Prognostics, Diagnostics)
- Property Accountability
- Redistribution
- Motor Pool Dispatching
- Quality Control and Surveillance (Food, Medicine, Ammunition)
- Access Control
- Command and Control
- Personal Debit and Credit Identification and Accounting
- Mail Sorting and Routing
- Hazardous Materiel/Waste Management
- Medical Personal Information Carrier (Electronic Medical Record)

Figure 4-1. Compendium of Applications

b. AIT applications. The AIT includes a wide range of capabilities, as addressed in chapter 1, which may or may not require an operator as part of the data entry or retrieval. Automatic identification means that a single event can result in the capture of a stream of data (from a single character to many thousands). It eliminates many of the manual techniques used in all retail and wholesale logistics operations. It includes activities at ports, air terminals and warehouses. The AIT includes a wide spectrum of technologies that will interface with host computer systems: bar codes (2D and linear), magnetic strip, voice recognition, radio frequency identification data communication, integrated circuit cards, flash high memory storage devices, optical character recognition, machine vision and biometrics identification.

c. Required skills and AIT operations. All personnel, from the most sophisticated computer user to those with only those computer skills required for their job, can operate AIT data collection devices. These activities include scanning, response prompting, processing, storage, retrieval, transfer, data transmission, and resource trace and identification. Data is either transmitted directly to a host computer by cable or radio frequency, or stored in an AIT device. Bar code printers are used to print machine-readable symbology on forms and labels. When other forms of AIT storage media for source data are required, they are carried by, attached to, mounted on, or integrated into individual items. These items include supply, supply commodity packages, major end items, personnel, and military patients (including prisoners of war).

d. Impact on CONOPS of AIT applications. The AIT is integrated across the strategic, operational, and tactical continuum. It supports all operations, from normal training through general conflicts. The AIT is incorporated into the operations of supply support activities, ports, terminals, warehouses, installations, and depots. Configuration and use of AIT is based on the organization's operational requirement and the interface requirement within its management information systems, and the computer hardware and software being employed. The support continuum is shown in Figure 4-2.

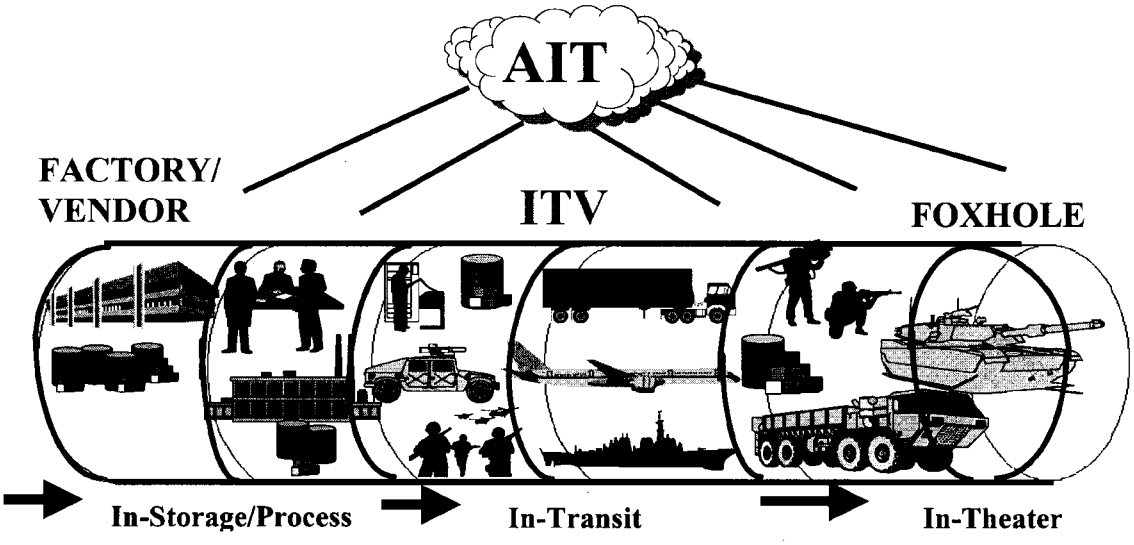

Figure 4-2. AIT SUPPORT Continuum

4–3. Tactical units

a. Tactical level. At the tactical level, the AIT is integrated into operations to provide a paperless, automatic capability for data identification, collection, entry, processing, storage, and retrieval. It is used to provide and support on-line communications between read/write or write capability and the information management systems present in tactical units. Linear and 2D bar coding, RFID, OMC, and smart cards all have unique advantages within their operational settings. Each of these technologies is used at one or more locations within the overall distribution system. At the tactical level, the predominant technology will be RFID, which is Omni-directional, read/write radio frequency for ITV and inside the box visibility. The RFID reduces manual processes, source data errors, and minimizes soldier requirements. The tactical combination of technologies is shown in Figure 4-3.

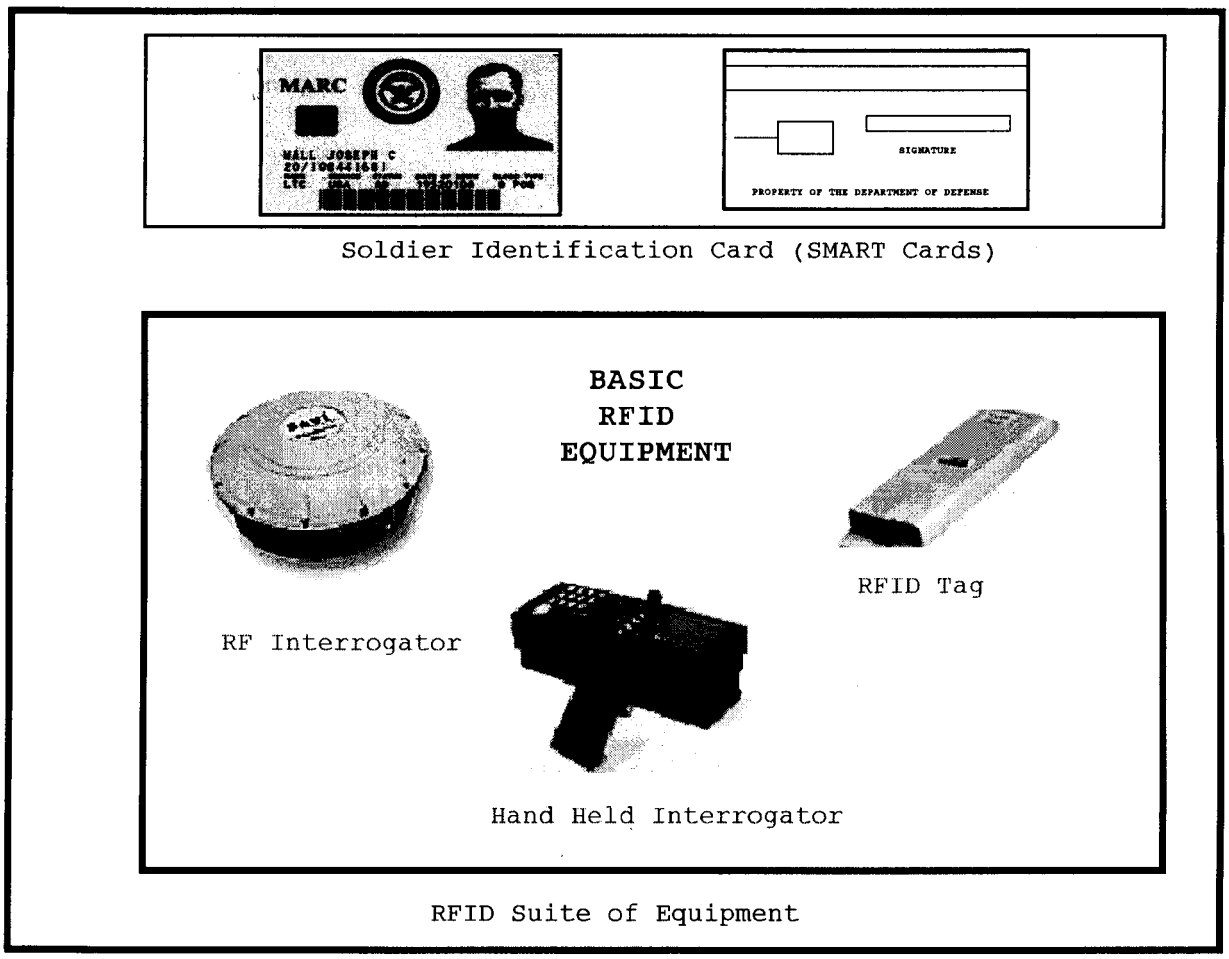

Figure 4-3. Tactical AIT

b. Soldier AIT/OMC (Smart Card). The individual soldier requires a significant administrative support structure. The AIT implementation in this area will streamline and reduce cost and performance time of personnel processing, equipment processing, medical support, travel and transportation, security, finance, and morale support. These processes will be performed more precisely and respond more quickly utilizing AIT. Also existing processes and infrastructure requirements will be reengineered and reduced by AIT. Applications will be implemented in the in-processing and out-processing procedures so the soldier can interact with data bases residing on installation computers, using individual smart cards populated with pertinent personnel data.

(1) *Medical personal information carrier application.* The medical application will replace paper documentation of medical treatment. It contains medical history, allergies, immunizations, patient encounter records, and such. This vital information is used to process inoculations, pharmaceuticals, laboratory tests, preventive medicine, injury and sickness treatment and patient tracking. The card will be populated with data that has read/write capability to allow interface with medical information management systems. It will have security access limits to prevent unauthorized disclosure. Soldier Medical Personal Information Carriers will be issued to every deploying soldier and used in the medical chain from the Battalion Aid Station, through the DOD and Civilian augmented support, up to the Military Medical System (TRICARE).

(2) *Transport Smart Card Application.* Smart Card technology will support the deployment and redeployment of individuals and units. Manifesting and movements between the continental United States (CONUS) and outside continental United States (OCONUS) stations will be documented in data bases using smart cards as the medium for getting personnel information (unit, SSN, weight, height, and such) for manifest, and the Time Phased Force Deployment List (TPFDL).

(3) *Personal financial smart card application.* Personal financial management will be accomplished using smart card technology. Soldiers will interact with graphical user interface (GUI) terminals for personal financial transactions.

A secure system will take the soldiers directly into the Defense Finance and Accounting Service system to transactions related to pay, including allocation of changes, in-transit transactions, and such. Personal purchases of goods and services are another financial service supported by the soldier smart card.

(4) *Equipment/unit smart card application.* The soldier smart card will be issued as part of the initial in-processing for all soldiers and used throughout the system. At the unit of assignment, unit specific applications for supply and services will be provided (for example, arms/serial-numbered item security, individual weapons, and training). The smart card has also been used successfully for admittance into secure areas, although this functional capability hasn't been fully developed.

(5) *Smart card security applications.* Security for the cards can be applied using any one of several techniques, including random number generation built in for a few minutes to the lifetime of the card, biometrics, or limited value over a specific timeframe. The technology associated with microprocessor chips allows flexibility in choosing the security aspects of the card.

c. AIT equipment. The AIT equipment is the application of various technologies that will provide location and status of individual parts and equipment. It includes the Movement Tracking System (MTS), which are imbedded chips that identify subassemblies or components of a system to automate the identification of parts, simplifies stock management, increases security, and make ease in ordering replacements. These capabilities will be part of the combat and material development equation when making decisions on future combat requirements. Examples of internal AIT are combustion pressure sensors, engine diagnostics controls, or on-board automated diagnostics-prognostics for continuous engine health checks through a complete sensor array. All systems on-board a tactical weapon system platform may be interconnected for monitoring from any battlefield computer based on the technology and an established operational requirement.

d. Distribution AIT. Tactical units place demands for supplies and equipment on a designated Supply Support Activity (SSA) responsible for providing direct support on a unit or area basis. In CONUS, the SSA could be organic to a Table of Organization and Equipment (TOE) Direct Support or a Table of Distribution and Allowances (TDA) organization such as the Installation Supply Division. In a forward location, the SSA will normally be organic to a TOE direct support unit (DSU). The operational efficiency of the DSU may be enhanced by the following suite of AIT: RFID, MROCS, Automated Management System (AMS), reader/writers, interrogators, hand-held and fixed. Orders may be processed electronically. In the AIT device for requesting units and suppliers, handling of multiple consignees and customer data flow will be encoded with Department of Defense Activity Address Codes (DODAAC). This information, along with other pertinent data unique to the requisitions, is to be uploaded into the STAMIS, which manages the commodity, including the Logistics Intelligence File (LIF) and the Global Transportation Network (GTN). All of these systems will be alerted to shipment actions as they occur or are about to occur. This process represents the "upward" flow of information. The "downward" flow of information is initiated at the wholesale supply level. Commodities are prepared for shipment based on requisitions that reach wholesale level. This is after requisitions have not been satisfied at intermediate levels or replenishment requisitions have not been filled. Tactical units, DSUs and SSAs are permitted to use commercial means in support of operations, to include: shipping and receiving, tracking shipments, and providing in-transit asset visibility for the customer. They may also use commercial means to provide status reports to higher levels of support. The flow of information is depicted in Figure 4-4. Wholesale activities will use AIT capabilities that support their operations.

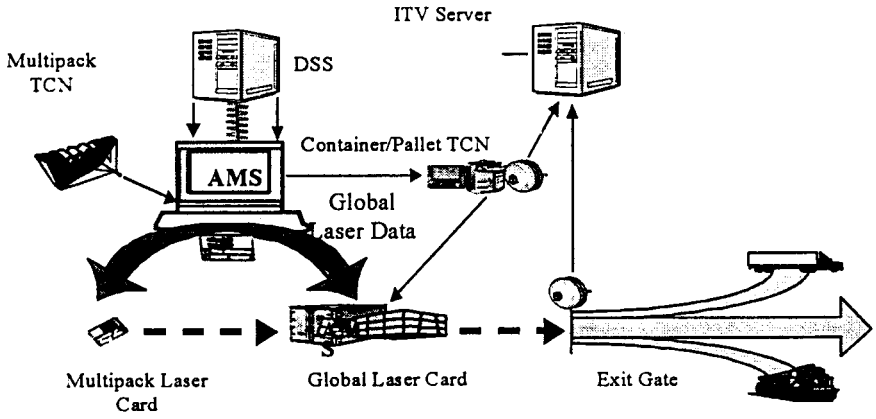

Figure 4-4. Distribution Information Flow

4–4. Distribution infrastructure

a. Flow of information. The flow of information depicted in Figure 2-4 is a high level view of the distribution system. The AIT technologies that are integrated into the distribution infrastructure and the emerging operational environment are described in detail in this section. The distribution infrastructure includes the commercial sector—from the manufacture of goods and suppliers of services to the Army Logistics System. Included is the transportation and communication infrastructure.

b. Distribution infrastructure and AIT technology, equipment, and terminology. All shipments, containerized cargo, equipment, replenishment stocks, items held for sale, including those in the Defense Reutilization and Marketing Office, will have bar code labeling affixed. They will be marked with radio frequency tags that are read/write capable and able to be interrogated at fixed terminals (rail, water, and aerial) or at mobile sites employed to support contingency operations. A network of "burn" stations will be established at major depots, centralized consolidation points (CCP), SSAs, theater storage areas (TSA), and corps storage areas (CSAs). Data is written to an RF tag either from a data base or by manually entering (typing on keyboard) the data using a RF tag docking station (or even a hand-held interrogator). Within divisional CCS units, Forward Support Battalions (FSB) and Ammunition Transfer Points (ATP), may be included as points at which to establish a tag writing capability—depending on the operational requirement. Trailer transfer points will also be instrumented with interrogators to provide ITV of shipments as operations dictate.

c. Distribution Infrastructure Integrated Network. The integrated network includes the connecting points for the data being gathered from the array of readers/writers, interrogators and tags on all equipment being shipped and personnel (passenger, patient, and unit member) being processed. The core connecting points are formed by systems such as: Shipping, Tracking and Redistribution Systems (STARS), MTS, Defense Transportation Tracking System (DTTS), and Regional ITV Servers. The means by which the automated source data is processed into decision information and asset visibility will remain with the STAMIS until the Global Combat Support System-Army (GCSS-A) is functional. Commercial capabilities that function as part of the DOD distribution infrastructure are included.

d. Change and the distribution infrastructure. It is appropriate for all activities from the unit level to wholesale/depot operations to include in the planning process commercial capabilities like company-provided tracking software and online access for visibility. Adoption of commercial capabilities in lieu of development of DOD/Service unique capabilities is the approach that will be followed as current equipment, software, and techniques are overcome by technological changes and advances. Organizational responsibilities are not changed based on the insertion of AIT in the distribution system. What has changed is the "how" of operational procedures and the responsiveness of the communication network.

e. Distribution infrastructure battlefield information architecture. The battlefield information architecture consists of an integration of local area networks (LAN), wide area networks (WAN) and battlefield automated systems (BASs). A communications architecture ties the many distributed elements into an integrated, interoperable, and cohesive network. Command, Control, Communications, Computers and Intelligence (C4I) support the distribution network on a global basis. Figure 4-5 depicts the global communications network. The seamless integration of these systems allows commanders C2 on the battlefield and supports transparent global C4I interfaces. These communication means afford the commander and his staff the ability to distribute critical information between higher, lower, adjacent, joint, and multinational forces as well as commercial sources of support. Voice traffic and data distributions are the primary

methods of passing this information. Figure 4-6 depicts the battlefield information architecture integration and how AIT fits within the communications framework.

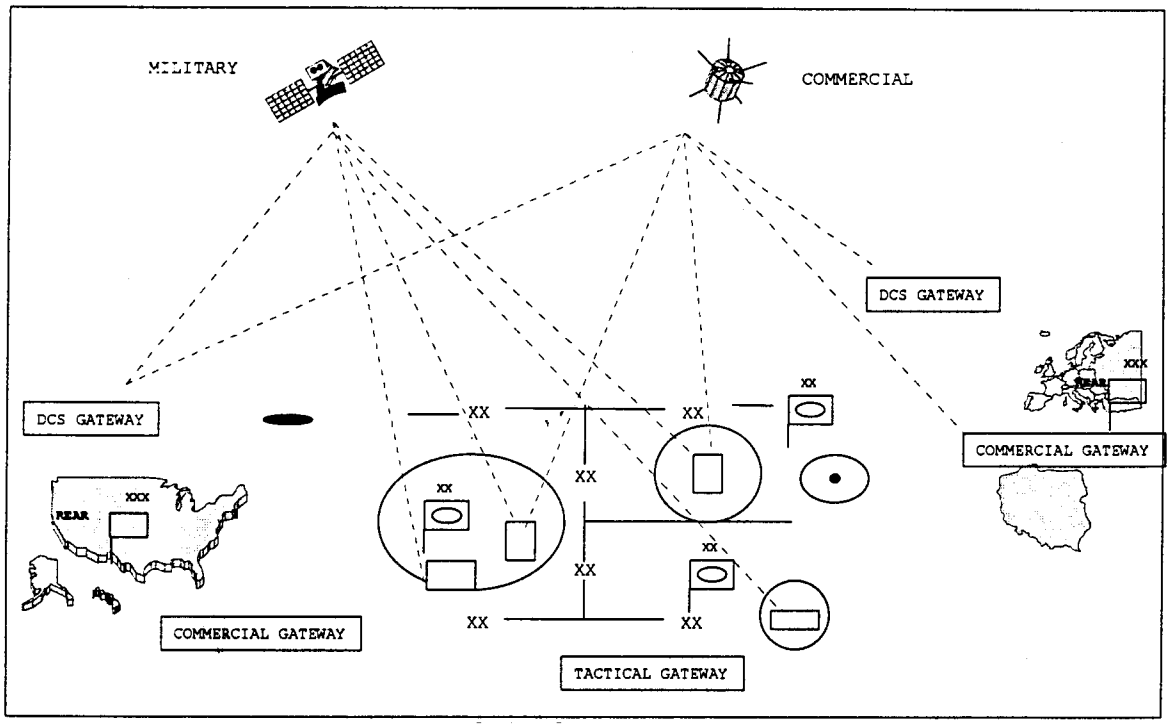

Figure 4-5. Global Communication Network

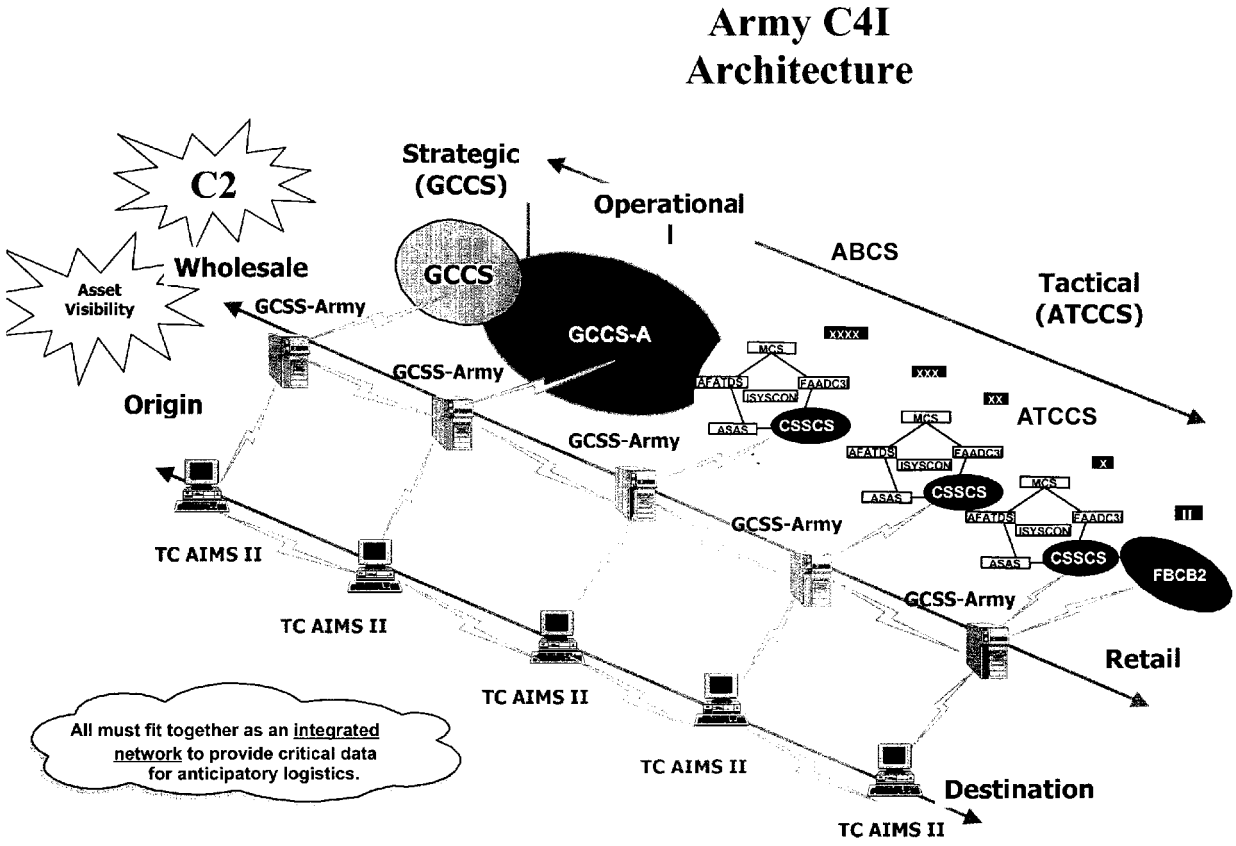

Figure 4-6. AIT in the Communication Framework

f. Combat Service Support (CSS) with AIT. The CSS operations, with integrated AIT, are reliant on communications. The CSS activities will access the Area Common User System, a terrestrial multichannel radio network through various switch configurations located with forward-deployed elements. This access gives the CSS element connectivity to the Defense System Network (DSN) and Defense Data Network (DDN). The CSS element area also provides the capability to interface with joint and international systems, which include commercial capabilities. To permit STAMIS connectivity to the ACUS, the CSS Automated Information Systems Interface (CAISI) connects the STAMIS and the local switch providing a CSS data flow.

4–5. Transportation

Transportation within the distribution system is a combination of the United States military and commercial sources (U.S. and Host Nation). In some special cases non-U.S. flag carriers (air and surface) are used to support US requirements. The available and emerging AIT equipment and procedures work equally well in both military and civilian environments. Transportation planners, mode operators, shippers, and receivers are now more capable in forecasting and predicting requirements, efficient mode operations, availability of supplies, and arrival of units because of the data that flows from the AIT employed throughout the network.

4–6. Wholesale support organization

a. The AIT wholesale level. The AIT at wholesale consists of the source data automation found at the tactical level, augmented by commercial means. Bar codes, RF tags, reader/writer "burn stations," interrogators, automatic and handheld scanners, forklift and conveyors scanners and reading stations, and floor grid scanner systems, in addition to commercial tracking software are all included in the AIT suite found at the wholesale level.

b. Item movement. Data at shipping activities, on items, those going into multipacks, into containers, or 463L pallets will be taken for bar code labels. This data will be used to produce automated packing lists. These lists will be written to RF ID tags that will accompany the shipments through the distribution system to the final destination. The transportation control number (TCN) of the multipack will be written to the RF tag as well. As the shipment leaves the depot, RF interrogators placed at key locations along the transportation route will detect the presence of the RF tags on

the shipment passing the interrogator's location. The RF interrogator then passes the RF tag numbers to the regional server. When it departs for the CCP, the Automated Information Management Systems such as the Commodity Command Standard System (CCSS), LIF, GTN and the Standard Automated Material Management System (SAMMS), the Defense Logistics Agency (DLA) will receive updated information on shipment traffic.

c. Shipping activity procedures. Source data automation (AIT) will go on items that are subsequently placed in multipack and are then placed in containers or on 463L pallets marked with bar code labels. All the data can be used to produce automated packing list.

d. Sea Port Of Embarkation (SPOE)/Aerial Port Of Embarkation (APOE) and Sea Port Of Debarkation (SPOD)/ Aerial Port Of Debarkation (APOD) and TCMD. As containerized cargo is moved to the SPOE/APOE, RF tags attached to the containers will be used to prepare cargo manifest documentation. The manifest may be prepared at terminal operations or at sites connected electronically with the port/air terminal operation (advanced manifests and TCMD). The reading of RF-tags at the port will aid in the identification and documentation of nonscheduled (overage) cargo. The tags will be used to report arrival and departure of cargo at SPOE/APOE in conjunction with the Worldwide Port System (WPS) and Consolidated Aerial Port System II (CAPS II). The same capability will be present at SPOD/ APOD and at sites where Transportation Coordinators' Automated Information for Movements System II (TC AIMS II) is in use (for example, at installations and deployed forward sites).

e. Tactical destination. The tactical destination is usually an SSA. Whether at an installation or at a forward location, the SSA receives multipacks, palletized loads or containers with RF tags attached. Automatic reporting of receipts, locating specific shipments, contents identification before opening and shipment process actions, are all accomplished by reading RF tag data on the accompanying supplies.

Part Three
Army Operations - AIT in Combat Service Support

Chapter 5
Introduction to AIT in CSS

5–1. General

a. The benefits associated with the introduction of AIT into the CSS battlefield operating areas are apparent without illumination. Streamlining operations, adopting commercial practices, where applicable, reorganizing process to generate savings in time and personnel were objectives set for CSS. Inserting AIT into the process has meant meeting these objectives. More important has been the increased ability to sustain the force and meet readiness goals that are crucial to achieving operational objectives.

b. The AIT in CSS operations are there to provide valid, usable information in a timely manner, with minimum effort on the part of the soldiers that must gather that data and information. To accomplish this requires a mix of technologies, used in concert with one another, and feeding data to the STAMISs. The AIT is to be vertically and horizontally integrated throughout the entire logistics and distribution system, which includes the tactical support elements, as well as General Support and Depot level support from AMC, DLA, and the DOD distribution manager, United States Transportation Command (USTRANSCOM).

5–2. Operational level AIT

FM 100-16 describes the operational level support as a dominant factor in determining the nature and tempo of operations. It is more than logistics; it is the means to execute the operational and theater strategic concepts. Combat support and CSS at this level enable tactical commanders to focus on their tactical missions because operational support missions are being performed by organizations of sufficient size (robustness), with C2 structures capable of directing a number of multifunctional units, including host nation and contractors performing sustainment operations. The AIT integrated at the operational level supports the ASCC ability to tailor support, respond to priorities established by the CINC, and assess CSS preparedness to meet current, emerging, and future operational requirements.

Chapter 6
Planning and Support of AIT

6–1. General

Enhancing productivity and creating force multipliers requires that managers have access to timely information to efficiently manage resources, such as supplies, people, equipment, and time. The AIT will provide portable data entry support to the CSS mission areas in the processing of logistical service support information for most tactical supply, ammunition, maintenance, and transportation activities.

6–2. Planning

The AIT is one of the key enablers for obtaining accurate and timely information on the status of assets, whether in-storage, in-transit, or in-process. The use of AIT in the planning process allows for greater asset visibility in the logistical pipeline. The operational planning process is key to the logistical footprint on available supply routes in support of combat service support operations. The AIT gives the CINCs flexibility in the planning process for a logistics architecture with the responsibility of moving materials and units. It is also a key enabler for the AIS, which supports this logistical effort.

6–3. Support of AIT

The DOD logistics AIT effort requires effective management to achieve the AIT CONOPS vision. The DUSD(L) is the focal point for all policy and guidance related to logistics AIT activities and issues. The AIT principals act as an oversight panel to direct, monitor, and coordinate the DOD Logistics AIT program. The DUSD(L) and J-4, the Joint Staff, in conjunction with the AIT Principals, designated DLA as the AIT Executive Agent (EA) for implementing AIT policy and guidance.

Chapter 7
Supply, Maintenance, and Ammunition Services

7–1. Supply operations

a. Retail and wholesale. The retail and wholesale supply operations in support of CONUS based Power Projection Forces must be viewed in three phases: the peacetime operations phase, the transition to war phase, and the sustaining phase of war. The transition phase is critical to logistics commanders, for without successful transition planning and execution, the theater cannot be sustained during war. The AIT facilitates supply operations during every phase with the transmission of information for asset visibility as well as transportation asset availability. The DSU, Aviation Intermediate Maintenance (AVIM) and general support units (GSU) are supplied primarily from the CONUS support base through the direct support system (DSS). The AIT will provide the CINC and material managers with information on the availability and visibility of materials as it flows from the DSS level down to the DSU level. Shipments can now be managed in a more timely and effective manner to support CINC directives.

b. Tactical. The AIT minimizes confusion in the tactical architecture of the supply process. The ability to directly observe the flow of cargo through the logistics pipeline satisfies the demand for pertinent information and provides operational control of that cargo. The movement of cargo, once in the theater of operations, is the responsibility of a developed AIS that supports movement of personnel and supplies such as GCSS-Army and TC AIMS II. With the aid of AIT, SSAs, Ammunition Supply Points (ASP), and ATPs will be equipped to:

(1) View or acquire information on shipments in-transit.

(2) Read AIT data upon arrival and report for pipeline closure.

(3) Use AIT to process receipts:

(a) As a tally check, using individual input through bar code scanning to check against the full contents as shown on the RF tag.

(b) With concurrent production of bin tickets and material release orders (issues), en masse.

(c) En masse, with a temporary location of the shipping container, with a concomitant suppression of bin tickets and material release orders unless specifically directed otherwise.

(d) Produce AIT tags for outgoing shipments or inventory purposes.

(e) Transmit asset information from the point of origin to the national data base, the regional data base, or the consignee as applicable.

c. Installation. The Directorate of Logistics (DOL) has control and is the main operator of AIT equipment in support of units located on the installation. The DOL and applicable units will receipt, store, distribute, and ship materials as well as coordinate the embarkation and debarkation of unit movement. Use of the AIT equipment for a warehousing and stock control procedure streamlines operations and improves the processing of all classes of supplies. The installation will forward data to the appropriate AIS and have direct access to a regional server or the Logistics Support Activity (LOGSA) data base to exchange information for ATAV. It is also a key data link for AIS on the movement of supplies through the logistics pipeline.

d. Wholesale. The AIT can provide visibility of wholesale assets whether in storage or in transit. The AIT devices contain supply and transportation data for use on pallet shipments, CCP-prepared sea/land containers, ammunition, and unit-cargo shipments moving in containers, movements of unit equipment, and pre-positioned cargo. The AIT equipment updates user AIS and supports a number of logistical processes, including container management, port operations, receipts, and distribution.

7–2. Maintenance

a. Repair. The DOD's requirements for in-process repair visibility range from detailed data, such as estimated completion dates and condition code changes by specific stock numbers and serial numbers, to broadly aggregated data, such as capacity planning information. The AIT equipment optimizes the movement of Class IX supplies and end item in a logistics support architecture. The DOD standard data will be linked to all reparable units using AIT. The Inventory Control Point (ICP) AIS would be the central repository for all in-process visibility information. All depot maintenance assets would be reported to integrated material managers, while intermediate maintenance assets would be reported through supporting retail supply activities. The following repair information will be captured and exchanged using AIT equipment:

(1) Location of assets being repaired at depots and intermediate-level facilities in CONUS, including commercial facilities and in theater at all levels.

(2) Estimated completion dates of repair to include significant adjustments that result from process time variances.

(3) Current and planned availability of unserviceable assets.

(4) Depot-level unserviceable assets (by stock number, serial number, and part number, as appropriate) for assets moving to depots for repair, the quantity and estimated dates of shipment and receipt.

(5) Quantity, condition code, and date received from the field or supply depot time of receipt at a maintenance depot.

(6) Pre-positioned data on incoming assets.

b. Tactical. The AIT equipment supports the movement of repair parts and end items from wholesale to retail, through the depot to the SSA for further distribution to the using unit. Having asset visibility enables the unit to plan and execute the maintenance effort with minimal flaws. The AIT will report data on the progress of the repair and return effort in the theater, as well as support transitions towards the integration of GCSS-Army.

(1) *Ground.* The AIT equipment will provide materiel managers information during the maintenance and life cycle of equipment. It will enhance the capability to better support the logistical effort by providing information technology for increased management operations and top-notch performance at the user level. It increases the visibility for parts in the supply chain as well as forecasts the maintenance repair/replace cycle for managers. As in any maintenance program, the repair and recycle of equipment is vital to supporting the operational tempo in the theater. Tracking supplies from factory to foxhole and maintenance cycles assists in decreasing the logistical footprint. Mechanics use for direct links to equipment records, schematics, and technical manuals that support their efforts.

(2) *Waterborne craft.* The maintenance effort for waterborne vessels is a similar function to its air counterpart. The AIT will help visualize the maintenance process as parts move through the supply chain and report repairs during the maintenance cycle. Item material managers will have a greater repair/replace forecasting ability, and pertinent information will be available for operational and maintenance decisions. Intermediate managers/commanders will have available information to plan deployment use in conjunction with the maintenance cycle. Mechanics will use the AIT equipment in support of the repair process by having immediate access to equipment records, referencing materials, and other information that is vital while performing maintenance. The AIT equipment will increase visibility of problems while underway by alarming operators of unexpected part or engine failure. The AIT equipment from the vehicle will exchange information with other STAMIS, such as GCSS-Army.

(3) *Aviation.* The AIT use will result in the high visibility during the maintenance cycle for all aircraft. The AIT will provide information to each level of the maintenance cycle, as well as report the supply process from factory to fox hole. The AIT helps the material manager by increasing the visibility for repair/replace forecasting of vital aircraft parts, providing information for maintenance and operational decisions, and giving pertinent information during the repair process to the mechanic. It will record and store aircraft use, as well as track operational hours for particular parts and give the mechanic ease in accessing pertinent repair information (for example, technical manuals, schematics, and records) that will increase the life of the vehicle. It will also alarm users of unexpected breakdowns and increase safety in operations while providing conceptual ease in performing and increase the efficiency of pre-flight inspection and maintenance checks.

c. Installation

(1) *The AIT supports the maintenance effort with visibility at all levels of maintenance.* Visibility of assets "due-out" from maintenance will provide for assets repaired at both organic and commercial facilities. It allows visibility of unserviceable, serviceable, and consumable assets, which will assist in identifying logistics pipeline bottlenecks. It will capture, store, and download information on in-process repair assets and that information will be available to the appropriate management level.

(2) *Special Repair Activity (SRA).* The AIT will also provide asset visibility on the repair progress and the supply status of required materiel through the logistics cycle. The AIT will exchange data with GCSS-Army (the integration platform for ATAV) to access material management information.

d. Wholesale

(1) *Asset visibility.* Major commands require visibility of assets at depot level and intermediate level maintenance organizations. It is essential when assessing the ability of their forces to execute planning scenarios, manage critical items with limited availability support deployment and sustainment operations, monitor status and location of assets

owned by or of concern to the commander, and make financial decisions. Maintenance and production facilities require detailed visibility to plan, prioritize, and distribute workloads and resources. They also: determine the disposition of inbound reparables; monitor the status and location of assets supporting the repair process; support the evaluation of repair performance; monitor the status and location of serviceable and unserviceable assets at intermediate maintenance facilities and depots; monitor the status and location of vendor-repaired assets; and identify materiel and equipment requirements to support programmed workloads. Intermediate and depot-level maintenance facilities require visibility of wholesale assets due in from procurement primarily for monitoring maintenance actions that are awaiting parts from wholesale supply. The AIT equipment supports this effort by the data exchange from the maintenance organization to the using unit. The AIT gives visibility from the commercial, depot, and supply process to the repair and reserviceability of the equipment once it returns into the supply cycle and is available for issue.

(2) *Forward Repair Activity (FRA).* Asset tracking and availability is consistently vital in conjunction with the maintenance effort of the Army. Materiel managers will better manage equipment by data exchange from AIT equipment and technology to the repair activity. The FRA will inform its maintenance process to GCSS-Army during the repair of equipment. The AIT gives greater asset visibility to managers/commanders in the logistical support process of the CSS effort by providing statistical and conditional data, monitoring status and location of vendor-repaired assets, and by identifying materiel and equipment requirements to support programmed workloads.

(3) *Special Repair Activity (SRA).* Asset tracking and availability for the maintenance effort mirrors that of the FRA. The AIT equipment maintains the visibility of the maintenance flow from organization to organization until the equipment is returned into the supply and replenishment process. The AIT equipment adds to the capability of monitoring the repair, maintaining records, and having additional equipment use records so maintenance managers can project and plan the repair/replace process.

(4) *Depot.* Integrated sustainment maintenance (ISM) focuses on central management and work loading of all sustainment maintenance activities. Readiness Based Maintenance (RBM) is a decision support system that will help the Army establish repair, purchase, and distribution priorities for Class IX materiel. The system's primary purpose is to maximize the probability of meeting weapons system availability objectives. The AIT assists these efforts with tracking unserviceable assets, equipment, and materiel in support of the maintenance effort to all repairable units. For assets moving to depots for repair, it tracks the quantity and estimated dates of shipment and receipt. At a time of receipt at a maintenance depot, it tracks the quantity, condition code, and date received from the field or supply depot. At time of induction into repair, it tracks the quantity, date, priority of repair, and estimated completion dates for both IMM-directed and non-IMM-directed repairs. Repair that is suspended because of a lack of available parts will be known through data exchange. At time of condemnation, AIT records the quantity and date assets are discarded. When repair is completed, AIT reports the quantity and date assets are ready for issue. At time of issue, either to a supply depot for stockage or to a customer for use, AIT records the quantity and date assets are issued.

(5) *Government Owned Contract Operated (GOCO).* This maintenance effort supports the repair process of the Army in accordance with FM 43-11, Direct Support Maintenance Operations (nondivisional), which is the established maintenance doctrine. The AIT provides visibility to the maintenance effort, as well as supports and documents the supply and repair process, by tracking the availability of equipment in the repair cycle.

(6) *Commercial Contract.* Contracted Logistic Support – Contract maintenance activities require the same asset visibility in support of the maintenance effort, in accordance with the established doctrine as their military counterparts. The AIT equipment assists this effort by providing the method and means to exchange data with AIS to follow end items and supplies during the maintenance cycle.

7–3. Ammunition

a. Ammunition. The expeditious, efficient, and secure distribution of ammunition to the warfighters around the globe is critical to power projection. This effort will integrate AIT, primarily RFID, into the ammunition process from wholesale depots through transportation nodes to retail units. The RFID provides "inside–the–box" visibility of container contents without having to physically open the container. This technology also provides the capability to track shipments from point of origin to destination. The goal of the Ammunition/AIT Integration effort is to maximize source data automation to streamline and automate ammunition transportation and delivery processes, in order to optimize visibility and accountability of ammunition assets. Numerous deficiencies in the process of ammunition requisitioning, accountability, and storage management were identified during various operations and exercises. Most deficiencies were corrected with the Standard Army Ammunition System–Modernization (SAAS–MOD), and many ammunition functions have been enhanced through the application of AIT. Information required to manage ammunition operations is manually collected and input into various stand-alone AISs at each node in the logistics pipeline, with little or no connectivity between AIS. Integration of AIT into the ammunition business process automates source data, integrates AISs, provides asset/ITV, reduces manual operations, increases data accuracy, provides near-paperless operations, and optimizes business processes.

b. Tactical. Ammunition/AIT Integration has high military value because it provides the warfighter an important asset—ITV for critical commodities. Providing ammunition to the warfighter at the right time, in the right place, in the right mix, and in the right quantities is an indispensable component of military operations. As with other classes of supply, AIT minimizes confusion in the tactical picture of the ammunition process. The ability to directly observe the

flow of Class V through the logistics pipeline satisfies the demand for pertinent information and provides operational control of ammunition. With the aid of AIT, ASPs, and ATPs will be equipped to:

(1) View or acquire information on all Class V shipments in-transit.

(2) Receive AIT data upon arrival and report delivery.

(3) Use AIT to process receipts:

(a) As a tally check, using bar code scanning of individual input to compare with the total contents as shown on the RF tag.

(b) En masse, with concomitant production of bin tickets and material release orders (issues).

(c) En masse, with a temporary location of the shipping container, with a concomitant suppression of bin tickets and material release orders unless specifically directed otherwise.

(4) Provide a capability to produce AIT tags for outgoing shipments or inventory purposes.

(5) Transmit asset information from the point of origin to the national data base, the regional data base or the consignee as applicable.

c. Wholesale

(1) *Distribution.* The AIT significantly enhances the overall distribution of Class V supplies within DOD. It is used to support the ITV requirements as documented in the Total Distribution Action Plan. The RFID will be used to facilitate processing and documentation. It will automatically report events that occur in the distribution system (arrivals and departures of shipments of ammunition), and locate and identify major end items, intensely managed supply items, and the contents of containers.

(2) *Depot.* Class V depot activities will capture shipment information on ammunition such as TCMD data and multipack/pallet/container content. This information will be written to an AIT device and attached to the cargo. The AIT device will be interrogated at the different transportation nodes to automatically report the departure from the depot, as well as arrival/departure of the cargo at the subsequent transportation nodes. In addition, shipment data is also made available to the port AIS (CAPS II/WPS) to create advanced cargo manifests.

(3) *Consolidation and Containerization Point (CCP).* As Class V items arrive at the CCP, AIT captures and reports arrival information to the regional server. Upon consolidation of multiple ammunition shipments, AIT devices receive new configuration shipment data from AIS operators. The new devices will relay departure information through the interrogators that report to the regional servers. This ensures asset as well as ITV.

(4) *Port of Embarkation/Port of Debarkation.* As ammunition shipments arrive at the POE/POD, arrival data is captured and passed to the regional server. Shipment information from the AIT device can also be used to help prepare cargo manifest documentation at the POE/POD. It will serve as an automated source of TCMD information, if advanced TCMD information has not been received from the depot.

(5) *Ammunition Supply Point (ASP).* As shipments arrive, the ultimate consignee information on the AIT device will be used to enhance the receipt process at the receiving ASP by reducing the amount of manual processing required to process the individual items within the shipment. The AIT will facilitate automatic reporting of receipt of shipment to the Ammunition AIS, locate a specific shipment, and identify the contents of a shipment without having to open it.

d. Pre-positioned war reserves. Pre-positioned war reserves include Class V (Ammunition) assets aboard pre-positioned vessels afloat. The AIT will provide material managers with the benefit of a management tool for reporting, accounting, and maintaining visibility of Class V assets aboard pre-positioned vessels afloat. Utilization of AIT will also assist with source data automation to update all levels of SAAS and facilitate the rapid handoff and distribution of Class V to the user and using units. This includes mass transfer of assets to other existing ammunition systems and the reporting of these assets to the Worldwide Ammunition Reporting System (WARS) and other accountable systems.

Chapter 8
Transportation

8–1. Planning

a. The ITV is the ability to track, from originating destination (during peace, war, and operations other than war) the identity, status, and location of Army unit cargo and personnel, medical patients, and personal property. The USTRANSCOM responsibility for ITV begins at origin and ends with receipt at the consignee or destination. The AIT equipment is a key enabler in assisting with the movement planning process. The RFID provides nodal ITV when attaching or affixing the RF tags to cargo and/or to unit equipment. As tags pass a “choke” point, the RF tag relays information to a server that forwards the information to a regional data base. “Choke” point designates a point along the transportation network that is a common point regardless of path taken. Often, “choke” points are located where modes of transportation change, for example, from ship to rail, or ship to truck. Also, buildings or gates at points of origin (depots) and final destinations (users) are often used as “choke” points. As an enabler to transportation AISs, AIT provides the means for basic data exchange that identifies units and cargo during the movement. This information

is necessary for logisticians to plan and execute the movement of cargo from factory to foxhole, and units from origination to destination. It also provides the signal feed to GTN through regional or the LOGSA data bases.

b. Unit cargo includes all unit equipment and accompanying supplies, including Army equipment aboard pre-positioned ships afloat, and Pre-Positioned Materiel Configured to Unit Set (POMCUS) stocks. To provide the status and location of all unit movements from origin to destination, DOD must be able to track commercial and organic shipments of cargo by the shipment identification number, transportation control number (TCN), unit line number (ULN), and unit identification code (UIC). Widespread use of these codes and numbers would enable users to maintain ITV of unit equipment on a line-item basis.

8–2. Movement program

a. The ITV operation concept for unit equipment movements calls for GTN to receive unit movement data from source systems, POE and POD systems, and theater transportation AISs. The source systems include the Army's Transportation Coordinators' Automated Information for Movements System II (TCAIMS II), which exchanges data with current AIS and future AIS for in theater logistics. TCAIMS II will feed ITV information to GTN and the appropriate POE system. As unit equipment reaches the POE, the port system (WPS) will provide GTN with port arrival, lift aboard the vessel, and departure data. The POD will send similar information to GTN and the theater transportation AIS. Finally, GTN would receive destination arrival data from the theater transportation's AIS.

b. Sustainment cargo—whether from CONUS, pre-positioned overseas, or afloat—is documented in accordance with guidance in Military Standards Transportation and Movements Procedures (MILSTAMP DOD 4500.32R) using TCMD, GBL, commercial bill of lading (CBL), freight warrants, and other nonstandard commercial formats and procedures. Employing AIT equipment, the tag receives cargo data and relays information to a source system along the movement route by interrogators until it reaches the next transportation node or consignee. The POE systems would provide GTN with actual port arrival information and actual port departure information. The POD systems will also provide port arrival, cargo discharge, and departure information to GTN, TCAIMS II, and to GCSS-Army while in the theater of operations. The AIT will increase the visibility of the movement with increased efficiency and support the decreasing logistics footprint.

8–3. Tactical support

The BD information requirements can be efficiently met with AIT. It is important that AIT actions are closely linked and driven by BD doctrine. The positioning, density, and use of AIT on the battlefield must be designed to support distribution managers and facilitate the decisions they must make. By relating AIT directly to BD doctrine, AIT will help link strategic, operational, and tactical logistics systems with the data needed to enhance the Army's ability to request, receive, redirect, and track materials within a single distribution system.

8–4. Strategic transportation

a. Transportation. The USTRANSCOM performs the mission of integrating the AISs used by the Services, Defense agencies, and transportation component commands to manage cargo and passenger movement in the Defense Transportation System (DTS) and provide ITV. The GTN provides asset visibility and movement information to component commands to support, plan, provide, and control common-user ground, airlift, and sealift transportation. The USTRANSCOM performs its mission by coordinating the efforts among its three component commands:

(1) Military Sealift Command (MSC).

(2) Air Mobility Command (AMC-not to be confused with the Army Materiel Command).

(3) Military Traffic Management Command (MTMC).

b. Assets. The AIT supports the movement and use of transportation assets by feeding passenger list data, equipment properties, and other logistical information to AISs such as TCAIMS II and GCSS-Army. These AIS enable planners to assign the best applicable lift asset for the movement. The AIT equipment also signals nodes that relay information to ITV data bases, which support the global functions of GTN.

c. Surface movements. The MTMC is the single management agency for all modes of CONUS transportation, common user ocean terminals within CONUS, civil transportation utilization to support mobilization, and deployment movement requirements. The use of AIT equipment captures surface movement by signaling a data base whenever the cargo/vehicle passes an interrogator along the pipeline travel. This information is relayed to a data base and becomes available to GTN.

d. Air movements. Air Mobility Command (AMC) provides strategic airlift assets, airlift control elements, and operates selected aerial ports. It develops supporting plans for common user airlift requirements identified in DOD mobilization planning. It operates bases, APOEs, and APODs in support of mobilization and deployment. The AIT identifies the movement of cargo at the APOEs or APODs, providing pertinent logistical information (for example, item nomenclature, weight, cube size, etc.) for air asset selection. Upon arrival of the cargo at an APOD or APOE, AIT technology provides the visibility of cargo to the ITV regional data base and updates GTN.

e. Port and air terminal. Port and air terminals provide a means for the employment of AIT equipment to function as a supply/cargo control tool at the POE and POD along the transportation pipeline. The AIT equipment becomes vital at each terminal with the capability of providing information for storage location and proper stockyard checks. The

RFID technology provides the information necessary to assist with cargo separation and classification and assists in the issue of supplies and equipment to units and provides further shipment guidance.

f. Commercial transport. Commercial carriers employ AIT to track containers, railcars, or other privately owned conveyances. However, not many vendors use AIT for shipment content information. Many carriers have the capability to cross-reference a container number with a bill of lading number (GBL/CBL) or other shipment reference number, as a requirement by their customers. With the use of AIT, as containers move through the military logistics pipeline, the customer can track its movement using the container number or other shipment reference number and then match that number against the detailed container contents information in a regional data base. The customer can, in turn, pre-position container handling equipment, additional transportation assets or material handling equipment (MHE).

8–5. Personnel, unit movements

a. A large number of temporary duty and permanent change-of-station personnel, medical attendants, filler, and replacement personnel move daily through military and commercial transportation systems. The ITV provides the capability to track the identity, location, and movement of those personnel to ensure that field units can be rapidly brought up to strength during crisis operations and war.

b. Unit personnel include all civilian and military passengers assigned to a deploying unit. Modern commercial communications and live media coverage of troop movements place additional emphasis on the commander's requirement for visibility of personnel moving from origin to a theater destination by air or surface transport. As a consequence, passenger details, such as name, social security number, service specialty code, ULN, ultimate destination, and in-transit location, must be readily accessible. The AIT equipment performs this functionality with the use of flash high memory devices, smart cards, and inputs to TC-AIMS II.

c. The ITV concept includes the electronic transmission of standard passenger manifests from CAPS II and the WPS to GTN. The TCAIMS II will provide advance TCMD information to the port systems (WPS/CAPS II). The WPS or CAPS II would, in turn, update GTN with vessel or aircraft departure information from the POE. Achievement of visibility occurs at the POD by updates to GTN from WPS and CAPS II. The theater, utilizing TC-AIMS II, achieves visibility through direct interface with WPS and CAPS II. The AIT equipment will enable the port AIS, CAPS II, and WPS to identify cargo during the debarkation process from vessels or aircraft and facilitate the identification and onward movement of cargo and personnel.

Chapter 9
Combat Service Support Information Management

9–1. Combat service support information management

Includes all systems that provide essential, timely, decisionmaking support to both tactical and support commanders and the staffs at retail and wholesale levels. These systems all require periodic automated source data inputs to ensure accuracy and relevance to decisionmaking. All automated source data systems will interface with the existing STAMIS at each level to provide data input.

9–2. Retail and wholesale systems

The Army's principal retail supply operations and management system is the Standard Army Retail Supply System (SARSS). The SARSS is used by active units, installations, and the Reserve Components. There are four integrated systems: SARSS-1 at the Supply Support Activity (SSA); SARSS-2AD at the Division, Separate Brigade or Armored Cavalry Regiment (ACR), and the Material Management Center; SARSS-2AC/B at the Corps and Theater MMC levels; and the SARSS Gateway. The key points of AIT insertion are the SSA for arriving supplies (pallets, flatracks, containers, and trucks), for critical item identification, researching NSNs, or sources of supply. In addition, AIT assists in arrival status activities, stockage (sorting, binning, accounting), updating SARSS, and shipping activities. Other SARSS functions supported by AIT are requisition routes, lateral searches, visibility of excess position, summary record asset visibility of sub-SARSS activities, and selective item visibility.

9–3. Ammunition management

Ammunition management is supported by AIT from the factory to the firing battery. The hazardous nature of ammunition imposes handling and storage restrictions unlike other supply commodities. The management information system at the retail level is the Standard Army Ammunition System (SAAS-MOD). General ammunition management is minimized at the ATP and ASP, where SAAS4 and SAAS-DAO operate. The AIT at these points is designed to provide inventory management (receipting, issuing, shipment tracking, and processing). Management also includes basic load visibility, interfaces between SAAS-MOD and SPBS-R, as well as flatrack deliveries to artillery batteries. At the corps and theater levels, management responsibilities are also supported by SAAS-MOD, while the wholesale level (National Inventory Control Point (NICP)) uses the Worldwide Ammunition Reporting System (WARS) and Guided

Missile Large Rocket Reporting System (GMLR) in addition to SDS and CCSS. In the general ammunition management at the corps, theater, installation, and NICP, AIT supports manufacturing, stockage, shipping, receipt, inventory (lot/serial number tracking), suspension actions, quality assurance, and restriction notices.

9–4. Maintenance management

Information systems support maintenance operations from the Unit Level Logistics System (ULLS-ground and aviation) at the company level through Standard Army Maintenance Systems (SAMS) to the CCSS and the Standard Depot System (SDS). The AIT will be used to support activities as diverse as Prescribed Load List (PLL)/Authorized Stockage List (ASL) management, oil and engine analysis, sample data collection, task performance, labor hours management, receipts and issues, equipment histories, serial number tracking, prognostics and diagnostics. The AIT applications will result in methodologies that improve readiness and reduce maintenance workload.

9–5. Transportation Information Management Systems

Support a broad range of transportation functions which at the tactical or retail level include mode operations airlift by (Army aviation), sea-lift by (Army vessels), ground transport, terminal operations, movement management and transportation planning. The AIT will be integrated to support these functions from the tactical to the strategic level to improve responsiveness, accuracy of reporting, unit deployment, tracking the movements of people, the mode of transport and the commodities they carry (Movement Tracking System). Transportation and AIT will be integrated in such a way that total in-transit-asset visibility for all operators, shippers, and customers is provided. Transportation information systems like Transportation Coordinators' Automated Information for Movements System II (TC-AIMS II), Worldwide Port System (WPS), Global Transportation Network (GTN) and CAPS II will all receive source data inputs from AIT employed throughout the distribution system. Data entries and data capture will be accomplished using portable AIT coupled with microcomputers for data processing capability.

Chapter 10
Command, Control, Communications and Computers Support Functions

10–1. Defense agencies

Supply, maintenance, petroleum, services and acquisition are functions performed by the Army Materiel Command, Defense Logistics Agency, and the General Services Administration. The AIT used by these agencies to perform data gathering and information interfaces within the standard systems like CCSS, SDS and SAMMS is similar in type and function as that found at the tactical and operational level. Industrial AIT provides the same capabilities, and data from their source data automation equipment can be used to provide input to Army systems, differences in technology notwithstanding.

10–2. The United States Transportation Command

The USTRANSCOM provides common user airlift, sealift, and terminal services to deploy, employ, and sustain forces around the world. The AIT employed at each of its nodes supplies the data and information that supports its daily missions and provides data and information to feed ITV systems and the Global Command and Control information systems for tactical and operational commanders and logisticians.

Chapter 11
Information Architecture

11–1. Command, Control, Communications Architecture – AIT

a. The Army Battle Command System (ABCS) is the integration of command and control systems found at all echelons—from the ground component commander at the theater or joint task force (JTF) level to the individual soldier and/or weapons platform. It is also the integration point of battlespace automation systems and communications, which functionally link strategic and tactical headquarters. The ABCS has three major components: the Army Global Command and Control System (AGCCS), the Army Tactical Command and Control System (ATCCS) and the Force XXI Battle Command, Brigade and Below (FBCB2) System. The logistics applications are contained in the Echelons Above Corps (EAC) portion of the Combat Service Support Control System (CSSCS) for example, supply, services, personnel, theater special operations, support mobilization, deployment, status of readiness and training, and transportation asset management. The scope of AGCCS is to evolve all the stand-alone systems into a suite of modular applications that operate within the Defense Information Infrastructure Common Operating Environment (DII COE). The Common Operating Environment is an approach to tailoring systems to meet individual/operator requirements,

while maintaining architectural freedom to evolve. The COE is a DOD mandated requirement. Automated information technology integration must be compliant with the DII COE, even though it is peripheral to the Army STAMISs.

b. The point at which data and information will be collected and collated to provide situational awareness of the CSS mission area is CSSCS/EAC. The strategic and tactical commanders will be provided time-sensitive, critical information on supply, fuel, medical, personnel status, transportation, maintenance, and other services by CSSCS/EAC. Simultaneously, CSSCS/EAC will be fed by the STAMISs, or the follow-on system AGCCS, which in-turn will be fed data from the AIT arrays. The data being supplied will be used to support CSSCS/EAC's capability to allow commanders to conduct trade-off analyses and evaluate potential courses of action based on different logistical scenarios. The communication network is an integrated tactical and strategic system, which is part of the three architectures.

11–2. Architectures

The Army's information management structure, of which AIT is a part, consists of a Technical Architecture (TA). The TA describes the minimal set of rules governing the arrangement, interaction, and interdependence of the parts or elements whose purpose it is to ensure that a conformant system satisfies a specified set of requirements. It identifies the services, interfaces, standards, and relationships.

11–3. The Operational Architecture

The Operational Architecture (OA) is a description (often graphical) of the operational elements, assigned tasks, and information flow that is required to support the soldier or the CINC. It defines the type of information, the frequency of exchange, and the type of task supported by these information exchanges.

11–4. The Systems Architecture

The Systems Architecture (SA) includes a graphics application interface and interconnections providing support for operational functions. The systems architecture defines the physical connection, location and identification of the key nodes, circuits, networks, and weapon platforms and allocates system and component performance parameters. It is constructed to satisfy operational architecture requirements in the standards defined in the technical architecture. The Army Technical Architecture (ATA) applies to all systems that produce, use, or exchange information electronically.

11–5. AIT conformity

a. The process of collecting data by automated means requires standards. The devices themselves require standards as well and must conform to the requirements of the operational environment. The AIT in ammunition operations, as an example, has been evaluated and a safety formula developed (Safety Evaluation of Microcircuit Integrated Technology for Logistics Application (MITLA) on Electromagnetic Sensitive Munitions (AED AEC-IE 39-90). This document provides details on power limitations for AIT equipment on and around ammunition. Of equal importance, operationally, are frequency clearances in nations around the world where US Forces will deploy with AIT equipment. The potential for US Forces' AIT to conflict with host nation internal broadcasts, safety, security or military systems, will be determined prior to deployment and emplacement of any network of AIT equipment. Clearance must be obtained prior to emplacement from the cognizant country authority during peacetime deployments. The cognizant CINC will accomplish contingency operation clearances.

b. To overcome some of the potential problems with frequencies and clearances, AIT selected for use will require few frequencies or be of such a frequency that its use around the world will not create significant friction or curtail utilization of AIT in all applications.

Chapter 12
Support Functions

12–1. Operations other than war

The most commonly occurring scenario for U.S. Forces is deployment in support of operations other than war on a global basis. The forces used for such contingency operations may vary from a battalion task force to a multi-service task force, which may include allied forces as well. The AIT in these scenarios will also vary from small, light-weight "flyaway" boxes to a full compliment of equipment that includes movement tracking systems, satellite communications, portable and fixed interrogator sites, and client server networks. The scope of the network is dependent on the operations supported. As activities and the commanders' need for information increase, the communication network will be a determining factor in how extensive the AIT network must be to support data requirements.

12–2. Rear area operations

The functions supported by AIT in the theater base and the communizations zone (COMMZ) are security (specifically EPW management), movement tracking (movements control), and noncombatant management. Logistic elements play a

large role in noncombatant management, including transportation, facilities, medical, and subsistence. Logisticians will incorporate AIT utilization into their plans for support and materiel requirement.

12–3. Reception, Staging, Onward Movement and Integration (RSOI)

The AIT supports data gathering and providing command and control information for the initial reception of units and equipment, preparation of staging areas, port and airfield opening, issuance of pre-positioned stocks, equipment and materiel, and accounting for personnel activities. Pre-positioned stocks are to be instrumented prior to placement. Collected data will be provided to support deployment, command and control information systems, as well as the logistics STAMISs for materiel management and future planning.

12–4. Movement tracking

Movements throughout the logistics continuum will be tracked using both airborne and surface tracking systems. Movements planning will take into consideration the capability provided by the movement tracking system—the ability to see "real time" the movement of the conveyance and the cargo. This capability allows for carefully orchestrating movements and reducing the "choke point" affect at critical junctures in the systems when coupled with the communications system.

Chapter 13
Strategic Level AIT

13–1. Strategic level AIT

Combat Service Support at the Strategic Level is based on the CINC's Strategic Concept of Operations, his force and sustainment estimates and the approval of those estimates, plus the placement of resources to support his mission priorities.

13–2. Anticipatory logistics

The national support structure is extended into the theater, using all capabilities to obtain data, information and intelligence to plan for support, conduct operation and anticipate the next requirement—anticipatory logistics.

Appendix A
References

Section I
Required Publications
This section contains no entries.

Section II
Related Publications
A related publication is merely a source of additional information. The user does not have to read it to understand this publication.

AR 700–8
Logistics Planning factors and Data Management, 30 April 1994.

AR 710–2
Inventory Management Supply Policy below the Wholesale Level.

AR 725–50
Requisitioning, Receipt and Issue System.

AR 750–1
Army Materiel Management Policy and Retail Maintenance Operations, 1 August 1995.

DOD 4000.25–2–M
Military Standard Transaction Reporting and Accounting Procedures (MILSTRAP), May 1989.

DOD 4000.25–6M
DOD Activity Address Directory (DODAAC), September 1991.

DOD 4000.25–1–M
Military Standard Requisitioning and Issue Procedure (MILSTRIP), May 1987.

DOD 4000.25–1–M–S–3
MILSTRIP Supplement for the Defense Logistics Management System (DLMS) Electronic Data Interchange (EDI) Procedures, October 1991.

DOD Directive 4140.1–R
Materiel Management Regulation, January 1993.

DOD 4500.32–R
Military Transportation and Movements Procedures (MILSTAMP), March 1987.

FM 1–500
Army Aviation Maintenance.

FM 9–6
Munitions Support in Theaters of Operations, Jan 1997.

FM 10–1
Quartermaster Principles, 11 August 1996.

FM 10–27
General Supply in Theaters of Operations, 20 April 1993.

FM 10–500
Air Drop Support Operations in Theaters of Operations.

FM 11–45
Signal Operations at Echelons above Corps.

FM 12–6
Personnel Doctrine, 9 September 1994.

FM 14–7
Finance Operation.

FM 55–1
Army Transportation Services in a Theater of Operations.

FM 55–10
Movement Control in Theaters of Operations.

FM 55–60
Army Terminal Operations.

FM 63–3
Corps Support Command.

FM 100–5
Operations.

FM 100–7
Decisive Force: the Army in the Theater of Operations.

FM 100–10
Combat Service Support (Logistics).

FM 100–16
Army Operational Support.

FM 100–19
Domestic Support Operations.

FM 100–22
Installation Management.

End User Manual For Radio Frequency Automatic Identification Technology (RF AIT), 15 October 1998

Operational Requirements Document for Automatic Identification Technology, 25 May 94

Mission Need Statement for Automatic Identification Technology, 4 Jan 93

Joint Pub 1
Joint Warfare of the US Armed Forces, 11 Nov 1991.

Joint Pub 3–0
Doctrine for Joint Operations, 9 Sep 1993.

Joint Pub 4–0
Doctrine for Logistics Support for Joint Operations, 25 Sep 1992.

Joint Pub 4–01.3
Joint Tactics, Techniques, and Procedures for Movement Control, 26 Jan 1994.

Joint Tactics, Techniques, and Procedures for Use of Intermodal Containers in Joint Operations.

Section III
Prescribed Forms

This section contains no entries.

Section IV
Referenced Forms

DD Form 1348–1A
Issue Release/Receipt Document

DD Form 1387
Military Shipping Label

Glossary

Section I
Abbreviations

ABCS
Army Battlefield Command System

AGCCS
Army Global Command and Control System

AIT
automatic identification technology

AIS
automated information systems

AMC
Army Materiel Command
Air Mobility Command

APOD
aerial port of debarkation

APOE
aerial port of embarkation

ARNGUS
Army National Guard of the United States

ASCC
Army Service Component Commanders

ASP
ammunition supply point

ATAV
Army Total Asset Visibility

ATCCS
Army Tactical Command and Control System

ATP
ammunition transfer point

AUTODIN
automatic digital network

AVIM
aviation intermediate maintenance

BAS
battlefield automated systems

BD
battlefield distribution

BOIP
basis of issue plan

C^2
command and control

C^4I
command, control, communications, computers and intelligence

CAISI
CSS Automated Information Systems Interface

CAPS II
Consolidated Aerial Port System II

CASCOM
Combined Arms Support Command

CBL
commercial bill of lading

CCP
consolidation and containerization point

CCSS
Commodity Command Standard System

CINC
Commander in Chief

COMMZ
communications zone

CONOPS
concept of operations

CONUS
continental united states

CSA
corps storage area

DCSLOG
Deputy Chief of Staff for Logistics

DDN
Defense Data Network

DISC4
Director of Information Systems for Command, Control, Communications and Computers

DOL
Directorate of Logistics

DOTLMS
doctrine, organizations, training, leader development, materiel and soldiers

DLA
Defense Logistics Agency

DSN
Defense System Network

DSU
direct support unit

DTTS
Defense Transportation Tracking System

EA
executive agent

EAC
echelons above corps

EDI
electronic data interchange

FRA
forward repair activity

FSB
forward support battalion

GBL
government bill of lading

GCSS-A
Global Combat Service Support - Army

GMLR
Guided Missile Large Rocket Reporting System

GOCO
Government-owned, contractor-operated

GTN
Global Transportation Network

GUI
graphical user interface

GSU
general support unit

IMM
item materiel managers

ISM
integrated sustainment maintenance

ITV
in-transit visibility

LAN
local area network

LIA
US Army Logistics Integration Agency

LIF
Logistics Intelligence File

LOGSA
Logistics Support Activity

MARC
multi-technology automated reader

MITLA
microcircuit integrated technology for logistics application

MMC
materiel management center

MSC
major subordinate command
Military Sealift Command

MTMC
Military Traffic Management Command

MTS
Movement Tracking System

NICP
National Inventory Control Point

NSN
national stock number

OA
operational architecture

OCONUS
outside continental united states

OMC
optical memory card

PEO-STAMIS
Program Executive Office - Army Management Information Systems

PM AIT
Project Manager, Automatic Identification Technology

POD
port of debarkation

POMCUS
pre-positioned materiel configured to unit sets

PO TACMIS
Project Office, Tactical Management Information Systems

RF
radio frequency

RFDC
Radio Frequency Data Communication

RFID
Radio Frequency Identification System

RSOI
reception, staging, onward movement and integration

SA
systems architecture

SAAS
Standard Army Ammunition System

SAAS-MOD
Standard Army Ammunition System - Modernization

SAMMS
Standard Army Materiel Management System

SARSS
Standard Army Retail Supply System

SDS
Standard Depot System

SPOD
sea port of debarkation

SPOE
sea port of embarkation

SRA
special repair activity

SSA
supply support activity

STAMIS
standard army management information system

STARS
shipping, tracking, and redistribution systems

TA
technical architecture

TCAIMS II
Transportation Coordinators Automated Information for Movements Systems II

TCN
transportation control number

TDA
table of distribution and allowances

TCMD
transportation control movement document

TOE
table of organization and equipment

TPFDL
time phased force deployment list

TSA
theater storage area

TRANSCOM
US Transportation Command

UIC
unit identification code

ULN
unit line number

ULLS
Unit Level Logistics System

USAR
US Army Reserves

WAN
wide area network

WARS
Worldwide Ammunition Reporting System

WPS
Worldwide Port System

Section II
Terms

This section contains no entries.

Section III
Special Abbreviations and Terms

This section contains no entries.

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