Chapter 6

Automation and Communication

"The key to success is a seamless communications architecture that allows commanders to see the battlefield in every dimension, and with capabilities such as Video Teleconferencing, Global Transportation Network, Radio Frequency Tags, and the Defense Tracking System that increases the commander's visibility and units' command and control."

LTG Robert E. Gray
Deputy CINC USAREUR, Dec 96

Theater distribution relies on accurate and timely information. Automated information systems (AIS) are the source of much of this information. For maximum effectiveness, AIS must be integrated with and supported by automated identification technology (AIT) and supporting communications.

SECTION I. AUTOMATION

6-1. This section talks about the AIS and AIT that are involved in distribution. For purposes of discussion, AIS are commonly broken into two types: command and control (C2) and Standard Army Automated Management Information Systems (STAMIS).

COMMAND AND CONTROL SYSTEMS

6-2. Command and control systems include both the joint Global Command and Control System and the Army Battle Command System.

GLOBAL COMMAND AND CONTROL SYSTEM

6-3. The Global Command and Control System (GCCS) is the key joint command, control, communications, computers, and intelligence (C4I) system. The GCCS and associated Service components have replaced the Worldwide Military Command and Control System (WWMCCS). Like WWMCCS, GCCS is a system of interconnected computers that provides an integrated C2 capability to the entire joint community. It provides up to SECRET-level information from a wide variety of applications that have migrated, or are in the process of migrating, from other systems including the Joint Operations Planning and Execution System (JOPES). GCCS provides a fused picture of the battlespace within the overall command, control, communications, and computers (C4) system. The Army Battle Command System (ABCS) is the Army's component of GCCS.

ARMY BATTLE COMMAND SYSTEM

6-4. ABCS integrates Army battlefield functional area systems to link strategic, operational, and tactical headquarters. It provides commanders and staffs at corps and below a relevant common picture through improved situational awareness and battlefield digitization. ABCS includes three components: the Global Command and Control System-Army (GCCS-A), the Army Tactical Command and Control System (ATCCS), and the emerging Force XXI Battle Command Brigade and Below (FBCB2) system (Figure 6-1).

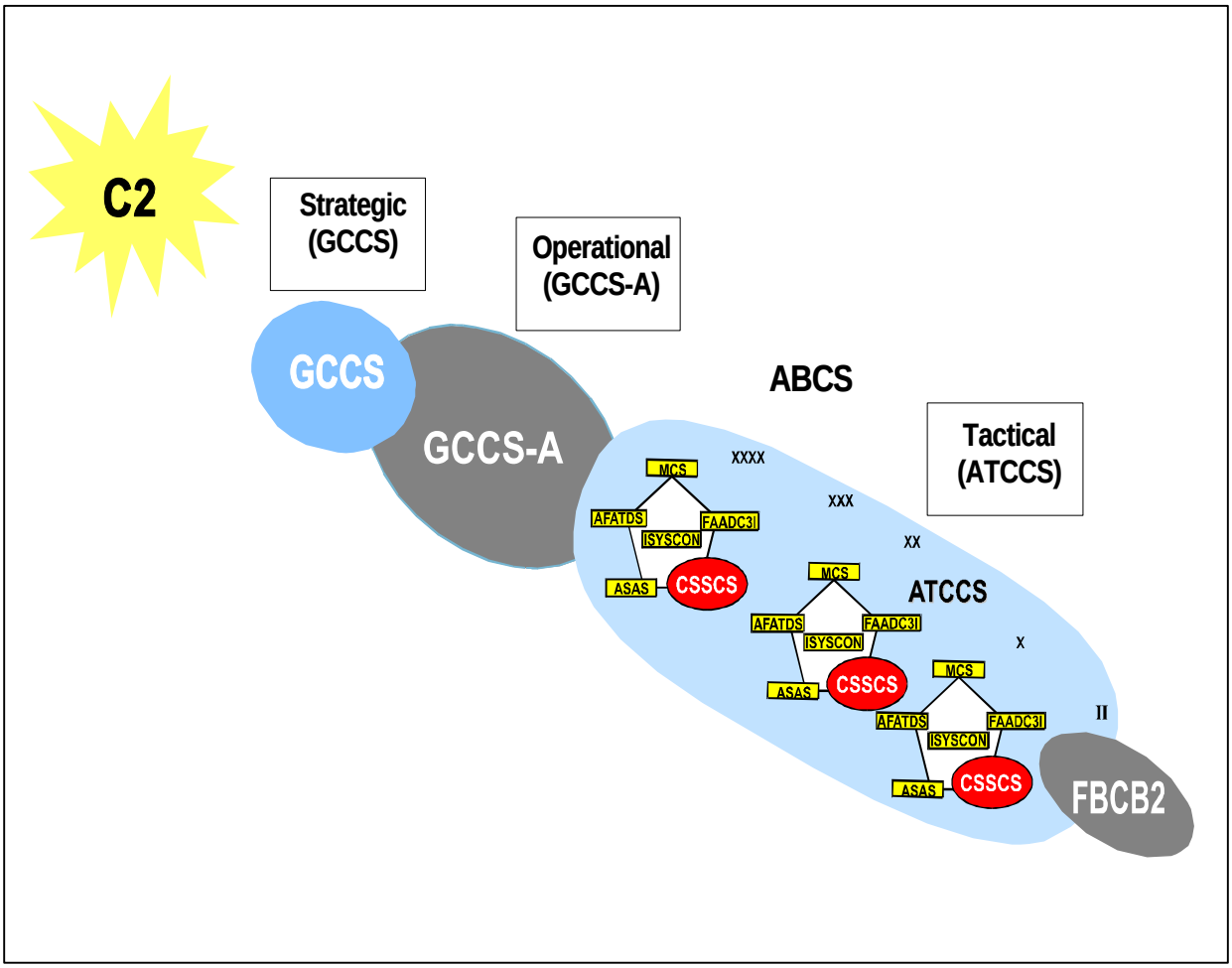

Figure 6-1. Army Battle Command System

Global Command and Control System-Army (GCCS-A)

6-5. GCCS-A is the corps and above operational component of ABCS. It establishes a direct link with the joint GCCS. GCCS-A will receive input from CSSCS and the STAMIS/GCSS-Army.

Army Tactical Command and Control System (ATCCS)

6-6. The Army has fielded the ATCCS to meet tactical C2 requirements from brigade to corps. ATCCS includes a standard automation architecture that uses tactical communications. ATCCS consists of the following five automated battlefield functional area control systems (BFACSs):

- Advanced Field Artillery Tactical Data System (AFATDS).
- Maneuver Control System (MCS).
- Combat Service Support Control System (CSSCS).
- All Source Analysis System (ASAS).
- Forward Area Air Defense Command, Control, Communications and Intelligence System (FAADC3I).

6-7. The relationship between these BFACSs and supporting communication is indicated by Figure 6-2. These systems use common and/or compatible application software and communication protocols, system languages, report formats, and necessary interfaces to ensure a cohesive and compatible overall C2 system.

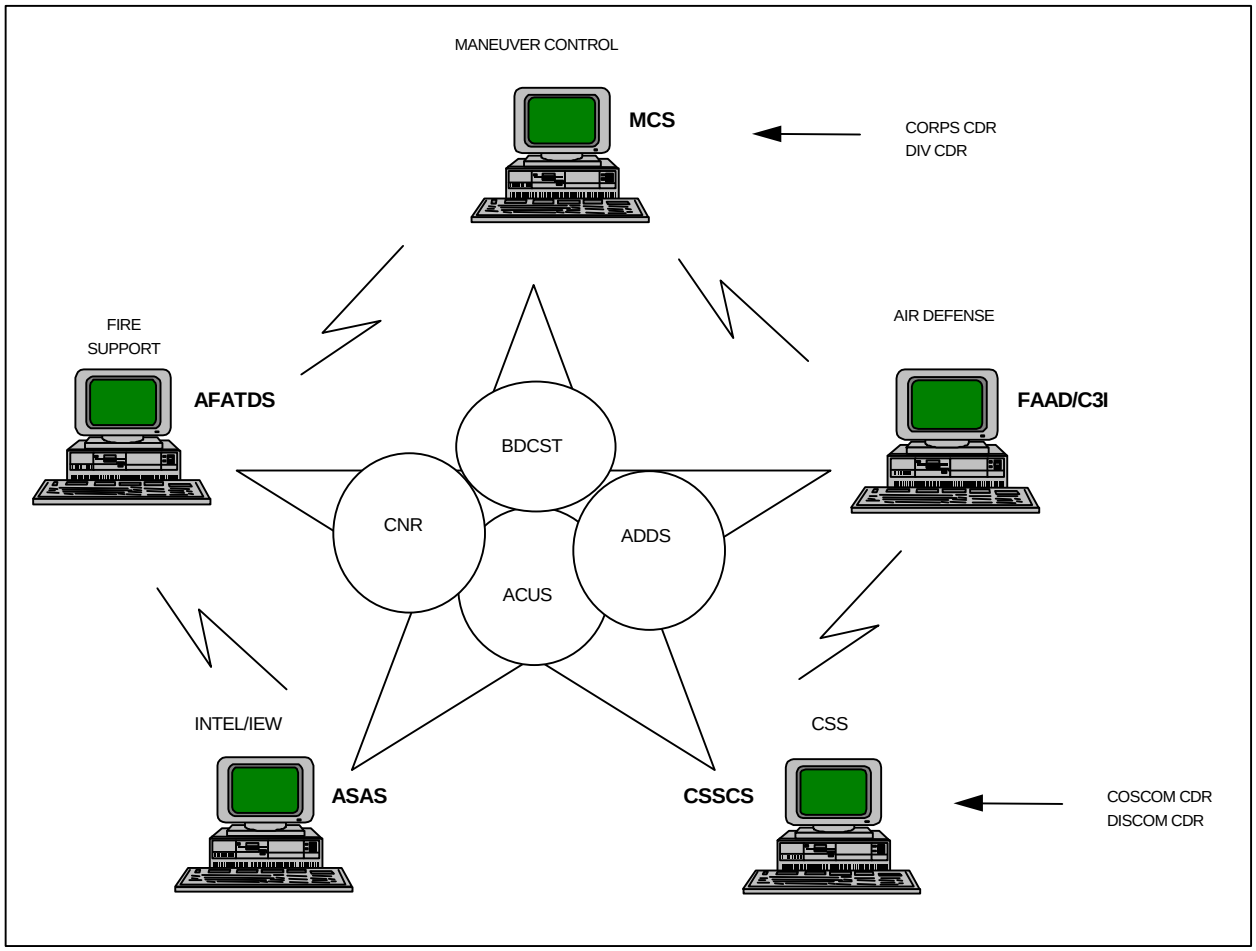

Figure 6-2. Army Tactical Command and Control System

6-8. CSSCS was developed to satisfy the Army's need for an automated system which provides CSS commanders and their staffs with logistics, medical, finance, and personnel information processing, reporting, and planning tools. This automated capability improves and accelerates the tactical decision making process and reduces the manual processing of data.

6-9. CSSCS provides automated support for the dual role of the CSS commander. It supports the command and control of subordinate organizations as they support operations. It also provides critical CSS resource information to the force-level commander for the decision making and battle planning processes.

6-10. CSSCS provides important C2 information to the CSS and force-level commanders and their staffs based on data received from the CSS STAMIS and subordinate staff elements. In addition, CSSCS exchanges CSS and tactical information with the other BFACSs. STAMIS and battlefield functional area (BFA) information is posted to the CSSCS database, to support the generation of reports, projections, and administrative/logistics orders, and to aid decision making and planning. CSSCS will interface with GCSS-Army, once it replaces the legacy STAMIS, and with FBCB2 when it is fielded.

Force XXI Battle Command Brigade and Below (FBCB2)

6-11. FBCB2 is an emerging system being developed to provide situational awareness and digital C2 capability for weapons systems operating in the brigade battlespace. In addition to its primary tactical C2 mission, FBCB2 is also being developed to automatically pass selected CSS information (such as status of fuel, rations, ammunition, and crew) to the appropriate CSSCS or STAMIS to allow CSS commanders to provide required support in an expedited manner.

STANDARD ARMY MANAGEMENT INFORMATION SYSTEMS (STAMIS)

6-12. Theater distribution depends on timely and accurate information about the CSS situation. This information, in turn, depends on the capabilities of automated systems including the associated automated information technology (AIT) and the supporting communications systems. STAMIS are used for the detailed, day-to-day processing of management information supporting CSS. They provide the detailed information needed for effective distribution management and are the key source of CSS data for the C2 systems. The ATAV architecture (Figure 6-3) shows a high-level overview of many of the key STAMIS used in support of the theater distribution mission.

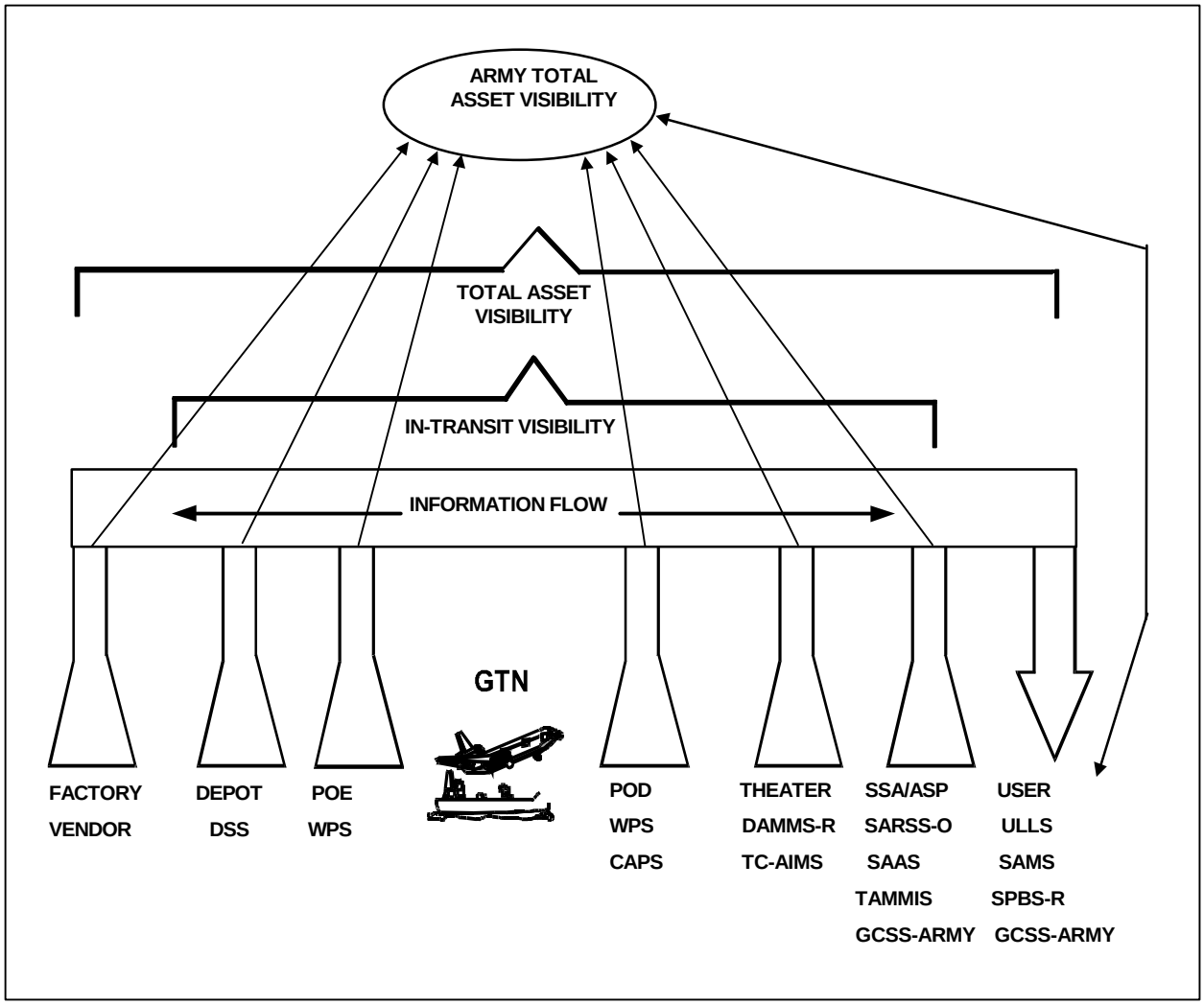

Figure 6-3. Army Total Asset Visibility Architecture

6-13. Effective theater distribution requires information from a large number of different automated information systems (AIS) employed to support the force. They include DoD-level systems used primarily at the strategic and operational levels such as the Global Transportation Network (GTN), the Joint Total Asset Visibility (JTAV), and the Worldwide Port System (WPS). They also include individual Service systems used at the operational and tactical levels such as the Air Force's Remote Consolidated Aerial Port Subsystem (RCAPS) and Cargo Management Operations System (CMOS), and the Army's SARSS and DAMMS systems. Although these systems provide much essential information to support theater distribution, there is not enough interoperability and data sharing between today's systems because they were developed over many years and do not share a standard technical architecture to include standard data elements. Fortunately, many of today's systems are being upgraded/replaced to improve interoperability. An overview of many of the key systems in use today as well as the systems currently in development is provided below.

PRESENT DAY/LEGACY SYSTEMS

6-14. Figure 6-4 depicts the distribution of present day/legacy AIS within a theater.

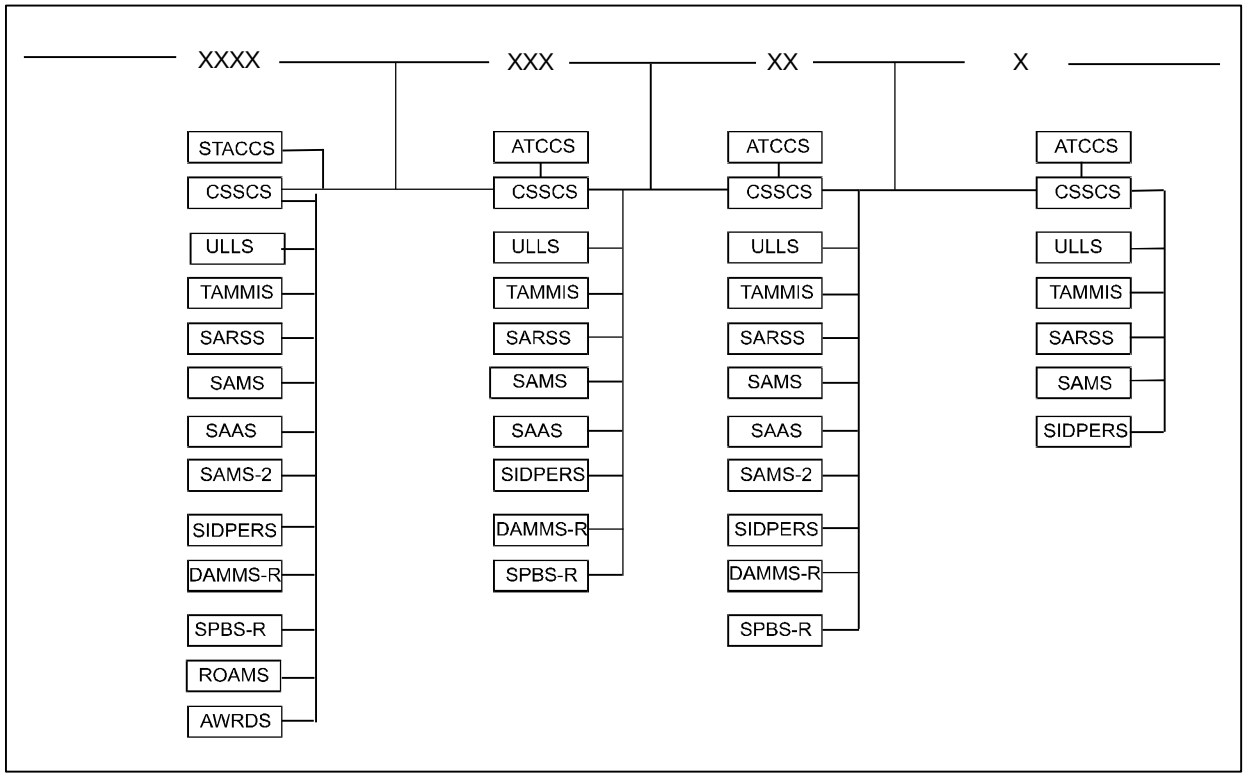

Figure 6-4. Present Day/Legacy AIS

Unit Level Logistics System (ULLS)

6-15. There are three versions of the Unit Level Logistics System (ULLS): ULLS-G, ULLS-S4, and ULLS-A. ULLS-G is used in units with an organizational maintenance mission. It is used to requisition Class IX supplies, manage the prescribed load list (PLL), dispatch vehicles, and perform maintenance-related record keeping IAW The Army Maintenance Management System (TAMMS) procedures. The ULLS-S4 system is used in organizational supply rooms and battalion and brigade S4 staff sections. ULLS-S4 automates the supply and property requisitioning and document register process, unit and section hand receipts and sub-hand receipts, budget, and logistics planning activities. ULLS-A is used in aviation units for the same basic functions as ULLS-G is used for in non-aviation units.

6-16. ULLS has automated interfaces with a number of STAMIS including the Standard Army Retail Supply System (SARSS), Standard Army Maintenance System (SAMS), Standard Property Book System – Redesign (SPBS-R) and the Standard Army Ammunition System (SAAS). These interfaces support the transmission and processing of supply and maintenance information.

Standard Property Book System-Redesigned (SPBS-R)

6-17. SPBS-R is an automated property accountability system that provides on-line management information and automated reporting procedures for property book officers (PBOs). SBPS-R interfaces with SARSS at the supply support activity (SSA) to requisition property book and other accountable items required by units. It interfaces with ULLS-S4 at the unit level to provide the information needed so that ULLS-S4 can generate the hand receipt/sub-hand receipt and component listings. SPBS-R performs automated reporting of assets to support Army Total Asset Visibility (ATAV).

Standard Army Maintenance System (SAMS)

6-18. There are two versions of the Standard Army Maintenance System (SAMS) used in the tactical environment: SAMS-1 and SAMS-2.

6-19. SAMS-1 is the automated maintenance management system used at the direct support (DS) maintenance companies found in the separate brigade, division, corps, and echelons above corps, and the general support (GS) maintenance companies at echelons above corps. The system automates work order registration and document registers as well as inventory control and reorder of shop and bench stock. It has an interface with SARSS-1 for the automated requisitioning of parts needed for work orders. SAMS-1 produces pre-formatted and ad hoc reports and allows extensive on-line inquiry. It also provides completed work order data to the Army's Logistics Support Activity (LOGSA) for equipment performance and other maintenance-related analyses.

6-20. SAMS-2 is an automated maintenance management system used at the support battalions in the division, and the materiel office of functional maintenance battalions and support groups in the corps and echelons above corps (EAC). It is also used at the material management centers (MMCs) at each echelon. SAMS-2 collects and stores equipment performance and maintenance operations data. The system provides the capability to monitor equipment non-mission capable status and control and coordinate maintenance actions and repair parts utilization to maximize equipment availability. SAMS-2 maintains equipment status by line number and unit within the command, maintains a record of critical repair parts and maintenance problem areas, provides visibility of backlog and planned repair requirements, and provides maintenance performance and cost evaluation tools.

Standard Army Retail Supply System (SARSS)

6-21. SARSS consists of three components: SARSS-1, SARSS-2A, and SARSS-2AC/B. SARSS-1 is the automated system used in SSAs at all echelons to accomplish the receive, store, and issue mission. SARSS-1 has interfaces to receive and process requests for issue from ULLS, SPBS-R, and SAMS-1. SARSS-2A is the automated supply management system used by managers in MMCs at the division, separate brigade, or armored cavalry regiment (ACR) level. It provides the tools necessary for item managers to establish stockage level and support relationships (which units are supported by which SSA for

which classes of supply), and to control the lateral issue process (that is, referrals) of assets between SSAs. SARSS-2AC/B is used at the corps and theater MMCs. It provides the same management capabilities for the corps/theater MMC managers who are responsible for corps/theater SSAs that SARSS-2A provides for divisional MMC managers. Additionally, it maintains the demand history files used for demand analysis and the interface with the finance system.

Standard Army Ammunition Supply System-Modernized (SAAS-MOD)

6-22. SAAS-MOD integrates all retail munitions supply functions and processes. It is used at three levels: corps and theater MMCs, ammunition supply points (ASPs), and the division ammunition office (DAO). The primary purpose of SAAS-MOD is to provide conventional ammunition assets to tactical commanders during wartime conditions. SAAS-MOD manages all conventional ammunition, guided missile large rockets (GMLRs) and their related components, and packaging materiel. The system uses desktop-type computers and associated AIT to accomplish these tasks. It provides in-transit visibility and stock record accounting for ammunition at the retail level. SAAS-MOD can interface with the following systems: SAAS, Commodity Command Standard System (CCSS), Worldwide Ammunition Reporting System (WARS), Standard Property Book System-Redesign (SPBS-R), Department of the Army Movement Management System-Revised (DAMMS-R), ULL-S4, and CSSCS.

Department of the Army Movement Management System-Revised (DAMMS-R)

6-23. DAMMS-R was developed as a theater cargo movement and mode asset management system. It provides timely and accurate information to movement managers, highway regulators, and mode operators within the area of operations. It provides shipment planning information, such as consignee listings, destination information, and cargo on hand, so the system user can determine priorities, forecast workload and conveyance requirements, and develop appropriate hazardous or local-unique documents. It also serves as the tool to develop a pickup/delivery schedule designed to maximize unit transportation assets.

Replacement Operations Automation Management System (ROAMS)

6-24. The Modernization and Operations Directorate (MOD), PERSCOM, assists in projecting individual manpower requirements during OPLAN execution. Once executed, MOD is responsible for managing replacement flows to the theater and ensuring supported units maintain at an acceptable personnel strength level. Currently, the following three automated systems support this mission:

- Automation of the Theater Shelf Requisitioning Process (AUTOREP). AUTOREP generates fillers and casualty replacement requirements by personnel category, military occupational specialty (MOS), grade, and

rank to predict the number of replacements required over time. Its product is known as the "Shelf Requisition."

- Non-Unit Replacement Personnel (NRP) Flow Computer Assisted Program (FLOWCAP). FLOWCAP is used by PERSCOM and CONUS replacement centers (CRCs) to schedule, control, and track the flow of replacements from the CRCs. Applications also provide manifest data for AMC and advance arrival information for the ASCC. They also generate internal reports for the CRCs to manage and process replacements.
- Automation of the Casualty Analysis Process (AUTOCAP). AUTOCAP compares actual casualty data and OPLAN modifications against projected and actual flow of casualty replacements and fillers. It also allows the ASCC to adjust projected requirements.

Standard Installation Division Personnel System (SIDPERS)

6-25. SIDPERS provides automated personnel support for active and reserve Army soldiers. It supports strength accounting, personnel management, personnel actions, and exchange of information with other automated systems. SIDPERS provides commanders the ability to optimize allocation and use of personnel assets to meet peacetime, mobilization, and wartime personnel service requirements. SIDPERS is a standardized personnel system responsible for strength reporting and personnel administration. The system provides for data entry, ad hoc queries, word processing, spreadsheet applications, battle rosters, personnel requirements reports, personnel summary reports, task force summaries, and miscellaneous functions. The replacement for SIDPERS is in the early stages of development. It is a joint system known as the Defense Integrated Military Human Resources System (DIMHRS).

The Army Medical Management Information Systems (TAMMIS)

6-26. TAMMIS tracks patients and manages medical supply information. Medical C2 information is provided through data roll-ups on the statuses of medical units, evacuation workloads, and critical workloads. The replacement for the logistics portion of TAMMIS is in the early stages of development. It is a joint system known as the Defense Medical Logistics Standard Support (DMLSS).

Army War Reserve Deployment System (AWRDS)

6-27. AWRDS is designed to support rapid force projection through forward storage of unit sets of equipment and sustainment materiel. This system contains the information required for the storage, maintenance, and issue of pre-positioned equipment and supplies stored in specific pre-positioned locations. FMs 100-17-1 and 100-17-2 have more details.

EMERGING SYSTEMS

6-28. This section discusses several key AIS under development which will relate to distribution.

Global Combat Support System (GCSS)

6-29. GCSS is a DoD-level integration and interoperability initiative to ensure interoperability across CSS functions, as well as between CSS and C2 functions.

It is neither an acquisition program nor a standard information system, but a strategy for enhancing CSS effectiveness within and between the Services. It requires each Service to implement common technical standards for their automated information systems IAW the Defense Information Infrastructure (DII)/Common Operating Environment (COE). This includes the use of standard data elements to improve interoperability and understanding when sharing information among the Services during joint operations. Each Service is in the process of upgrading to these new technical standards. The Army's program to implement these standards is known as GCSS-Army.

Global Combat Support System-Army (GCSS-Army)

6-30. GCSS-Army is being developed as the replacement for several of the Army's current STAMIS. It will operate in conjunction with other key systems (such as Transportation Coordinators' Automated Information for Movement System II[TC-AIMS II], MTS, and CSSCS) to provide support personnel detailed information about what support is required by the war fighter and the current availability of needed material to include items in the distribution pipeline. GCSS-Army will address the Army's current automation dilemma of having "stove-piped" systems, that is, systems that do not share information horizontally among different functional areas. It will employ state-of-the-art technology to include client-server technology designed to take full advantage of modern communications protocols and procedures. It will be designed with the maximum amount of communications capability and flexibility so that it can take advantage of any available communication systems to include commercial or military, terrestrial or space based. GCSS-Army will comply with the DII/COE technical standards and data element standards. Compliance with these DoD-level standards is a critical step toward achieving the required joint interoperability goals in support of the DoD GCSS. See Figure 6-5.

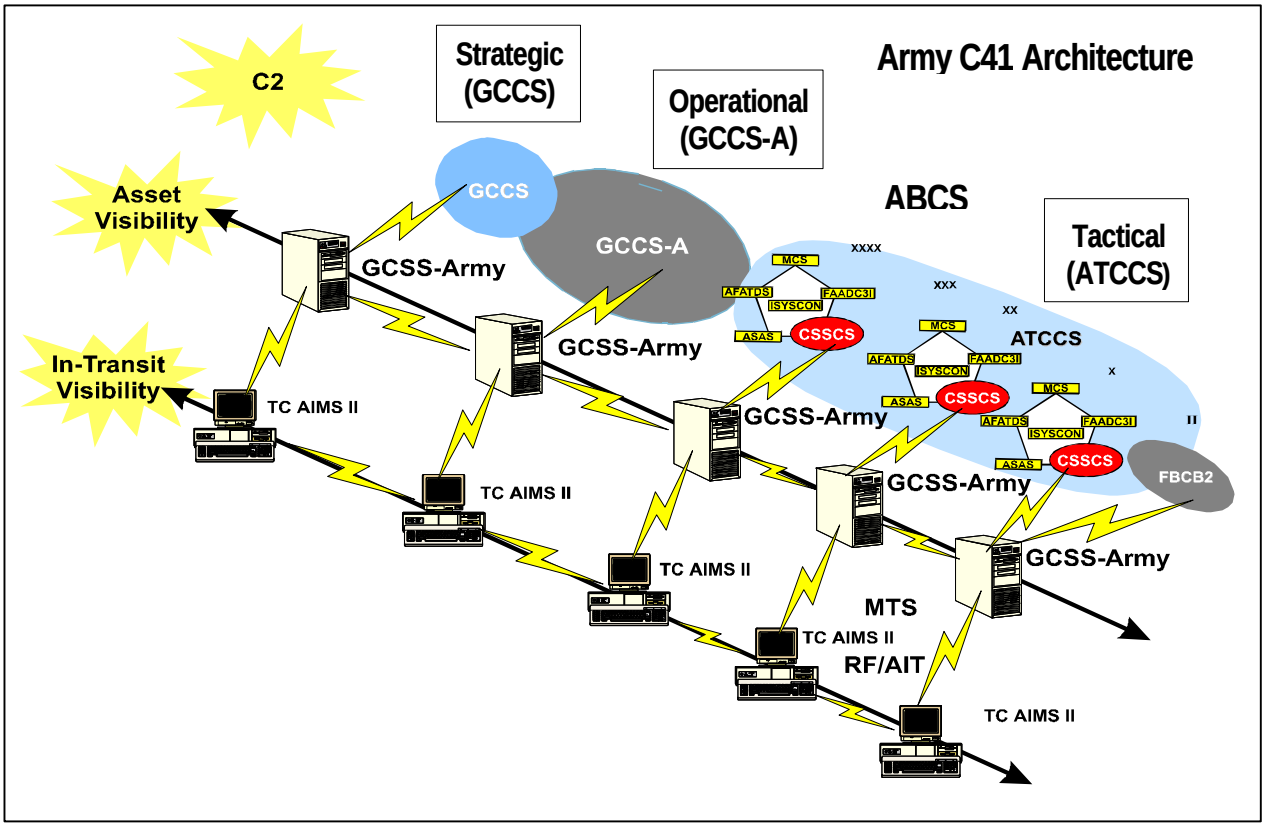

Figure 6-5. Emerging CSS Automation

6-31. GCSS-Army is being developed in three tiers as outlined below. These tiers are being developed concurrently, not one after the other. The tiers are:

- Tier I: Initial Operational Capability (Integration and Modernization). This tier will result in the integration and modernization of current tactical logistics STAMIS to include the integration of information from other CSS areas (medical, personnel, and finance). The functional areas to be integrated in Tier I include supply, property, ammunition, and maintenance functions (less medical). The principal tactical STAMIS to be functionally integrated and replaced include: ULLS, SARSS, SPBS-R, SAAS, and SAMS. Tier I of GCSS-Army will include several different modules each based on a common technical architecture and common look and feel using modern Graphical User Interface (GUI) point and click technology to include embedded training. The Tier I modules include –
  - A supply and property module that integrates supply operations and property accountability in all units.

- A maintenance module that integrates maintenance operations (ground, aviation, and water equipment) at each level of maintenance.
- An ASP module that integrates Class V management and operations at ASPs.
- An SSA module that integrates the supply management and operations at SSAs.

- An integrated materiel management module that integrates supply, property, ammunition, and maintenance management in all materiel management organizations.
- A management module for use at each echelon that integrates information from multifunctional CSS data sources (logistics, medical, personnel, and finance) and allows for data exchange with other GCSS-Army modules and external AIS.

- Tier II: Enhanced Operational Capability (Wholesale and Retail Integration). This tier will include a systemic review of the entire CSS process from factory to foxhole (wholesale/retail business process reengineering). The objective will be a seamless system with total asset visibility and control that effectively eliminates functional disconnects that have developed over the years between the wholesale and retail CSS business practices. The resulting system will dramatically reduce infrastructure costs while significantly improving the ability to achieve the goal of focused logistics (that is, providing time-definite, location-specific delivery of materiel to the war fighter).

- Tier III: Full Operational Capability (Joint Interoperability). Joint interoperability is being addressed in all tiers of GCSS-Army. The Tier I and Tier II compliance with DII/COE standardization and DoD-level data element standardization is a significant step toward joint interoperability as it will allow data to flow seamlessly between the Services and the joint force commander and staff. Tier I also includes intra-Army CSS interoperability between the GCSS-Army management module and the joint systems being developed for use within the Army in the medical, personnel, finance, and transportation areas. Inter-Service support (such as Marines getting supplies from an Army SSA or vice versa) is also included in Tier I. The wholesale/retail business process reengineering in Tier II will include joint/DoD-level systems for inventory management and asset visibility (DLA, JTAV).

Transportation Coordinators' Automated Information for Movement System II (TC-AIMS II)

6-32. TC-AIMS II is being developed as the deployment system of the future and will replace DAMMS-R and selected other Army transportation systems. It is a DoD system being designed for use by all Services. It will support all unit and installation deployment, redeployment, and retrograde operations requirements. The TC-AIMS II design incorporates the best parts of each component's transportation system and the unique needs of each Service to create a joint transportation system.

6-33. TC-AIMS II will operate in conjunction with the GCSS-Army and the MTS to provide the automated tools needed for successful distribution management. TC-AIMS II will provide the capability to automate unit movement and installation transportation office/traffic management office (ITO/TMO) planning and execution from both in-garrison and deployed field environments. TC-AIMS II will also provide an automated information management capability to managers involved with movement control and allocation of common-user land transportation in a theater of operations. TC-AIMS II will also provide needed data to the Global Transportation Network (GTN) and C2 systems at various command levels. TC-AIMS II will be the standard joint transportation and deployment information management system.

6-34. TC-AIMS II will operate in garrison to support daily military transportation requirements, transportation and specific deployment-related deliberate planning requirements, and transportation and deployment-related execution requirements. The garrison configuration will use existing base communications. TC-AIMS II will provide data to the GTN and to the Defense Transportation System (DTS).

6-35. TC-AIMS II will have the capability to provide support in field conditions, to include during reception, staging, onward movement, and integration (RSO&I). All requisite data must be available to accomplish RSO&I of personnel, supplies, and equipment. The communications capability must also be available to handle the interface and to share data with GTN and DTS as well as with joint/Service/C2 systems and other critical transportation and deployment systems. Units with deployment, movement control, or mode operations missions will deploy with their own TC-AIMS II hardware platforms.

6-36. TC-AIMS II will provide movement control organizations within a theater of operations an automated capability to forecast the arrival of personnel, inter-theater cargo, and containerized shipments, and to maintain visibility of command-interest cargo throughout the theater. Movement control elements will have the capability to coordinate and provide transportation services to shippers, carriers, and receiving activities. Automated functions include documenting transportation movement requests, tasking mode operators, forecasting, and reporting container and cargo movements. Mode operators will have the automated capability to receive commitments, task specific assets, and maintain fleet asset status data. Other capabilities include scheduling and de-conflicting convoy movements, maintaining unit location data, and maintaining in-transit cargo and asset movement visibility.

Movement Tracking System (MTS)

6-37. MTS will support distribution management through the full spectrum of military operations. The system's integration with TC-AIMS II and GCSS-Army will provide commanders and distribution managers an unprecedented movements tracking, control, and management capability. It will provide near real-time information on the location and status of distribution platforms using cabin console-mounted hardware and satellite

technology. MTS will incorporate various technologies including GPS, AIT, vehicle diagnostics, and non-line of sight communication and mapping.

6-38. MTS capabilities will improve the effectiveness and efficiency of limited distribution assets. It will provide flexibility and control over distribution operations to include the ability to re-route supplies to higher priority needs, avoid identified hazards, and inform operators of unit location changes. Future plans call for MTS to interface with embedded equipment diagnostic and prognostic systems to provide accurate data that will aid fleet maintenance and improve availability and overall service life.

6-39. MTS will be used primarily to enhance distribution operations from the POD to the brigade rear boundary. MTS control stations will be established in DMCs, movement control elements, distribution terminals, and mode operators. Control stations will also be established with FSBs to provide brigades with the capability to monitor and control non-brigade assets within their AOs. Additionally, the MTS will improve the operational effectiveness and efficiency of a number of other support activities, including traffic regulation control, maintenance and recovery, medical evacuation via ambulance, field services, financial management, religious support, and water transport. The plan is that all common-user logistic transport (CULT) vehicles and selected combat support (CS) and CSS tactical wheeled vehicles and watercraft will be fitted with the MTS mobile units.

6-40. MTS will consist of long-range digital communications, GPS, and computer capability. It will provide the distribution system the capability to –

- Track the location of vehicles and communicate with vehicle operators (US and HN).
- Provide real-time in-transit visibility (ITV) of movements within a theater.
- Redirect movements based on changes to battlefield requirements.

6-41. Transportation elements will use MTS to monitor and control in-transit status of their equipment tasked to move unit or non-unit equipment, supplies, and personnel throughout the theater distribution system. The MTS also will provide the capability to synchronize resupply actions with fluid movements of maneuver forces ensuring that the right resources are at the right place at the right time. MTS will maximize transportation asset utilization and efficiency, thus reducing overall operational times and associated costs. AIT will be used to document arrival and departure events at nodes within the Defense Transportation System for ITV. MTS provides real-time tracking and messaging between transportation managers and the vehicles actually moving resources. This permits re-routing, redirection, and synchronization of supplies with maneuver forces.

Defense Finance Battlefield System (DFBS)

6-42. DFBS is a deployable computer system that provides fully integrated finance, accounting, and resource management support, such as military pay, disbursing, vendor support, travel, civilian pay, and non-US pay, between the battlefield and the DFAS. Finance organizations will use the

DFBS in concert with other systems and automation enablers to facilitate responsive financial management support in all operations. DFBS is compatible with other CSS platforms and is upgradable to incorporate future systems and technological changes.

AUTOMATED IDENTIFICATION TECHNOLOGY (AIT)

6-43. AIT is not an automated information system as such, but rather a valuable component or peripheral of other AIS. When properly integrated into other AIS,

it is a key enhancement to help obtain accurate and timely distribution information, such as the status of shipments and distribution platforms. AIT consists of a suite of many different tools used for automating data capture, aggregation, and transfer. Examples of AIT include simple (linear) bar codes, 2-dimensional bar codes, memory cards, smart cards, laser cards, radio frequency identification (RF ID) equipment (including RF tags and interrogators), and radio frequency direct communication (RF DC) equipment. To function effectively, AIT must be fully integrated into the various AIS.

6-44. Figure 6-6 depicts some of the current and emerging uses of AIT in providing visibility of commodities, equipment, and personnel through the strategic, operational, and tactical continuum. Updated information on AIT developments is available on the CASCOM homepage at http://www.cascom.army.mil/automation/Auto_ID_Technology/.

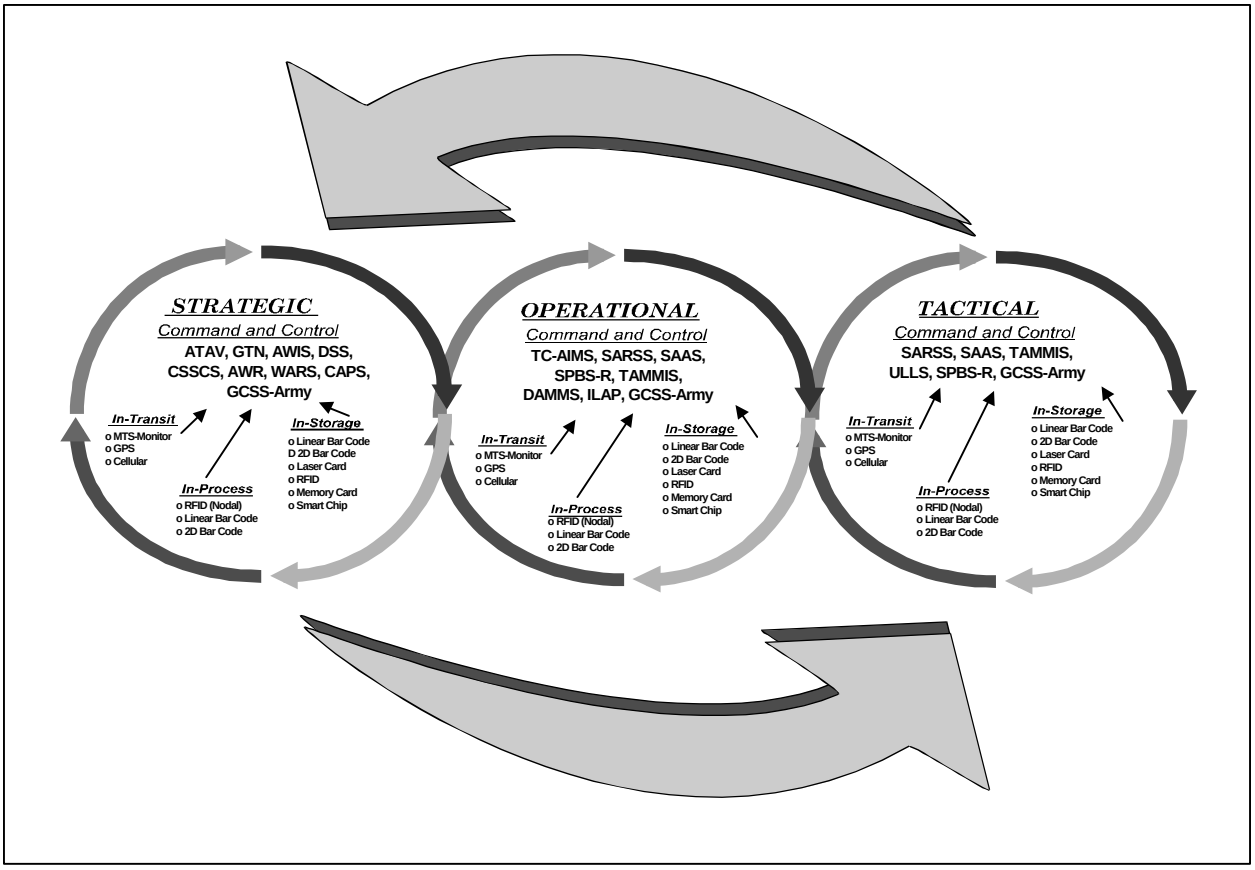

Figure 6-6. AIT Elements within the Strategic, Operational, and Tactical Continuum

CURRENT AIT USE

6-45. AIT has been used in the past and continues to be used today to a limited degree. Although it has proven useful, AIT has not yet been fully integrated into the various AIS. The strength of today's AIT is its ability to rapidly capture detailed information and interface with AIS to reduce human intervention and improve accuracy. The Army is currently using a number of AIT devices that support distribution management:

- Linear bar codes provide item identification and document control information for individual items and shipments. These have been used for years for material release orders (MROs) and transportation control and movement documents (TCMDs).
- Radio frequency (RF) tags with TCMD and content data have been applied to containerized cargo such as ammunition and food. They have also been applied to air line of communication (ALOC) pallets with repair parts or general supplies and to unit cargo moving in containers. These RF tags are used for ITV and support the reception, staging, and onward movement of unit equipment and sustainment materiel within the theater.
- The Multi-Technology Automated Reader Card (MARC) is a multi-function integrated circuit card (that is, smart card). It contains a photo, bar code,

magnetic strip, and a 2 to 8K computer chip. Its uses include rapid and accurate collection of personnel information needed to capture manifest information for personnel movements via military air or ground conveyance.

- MTS includes use of satellite tracking via GPS equipment and provides the capability to identify the position, track progress, and communicate with the operators of tactical wheeled vehicles.
- Two-dimensional bar codes can provide comprehensive data on documents, individual items, or shipments, and consolidation data on multipacks and air pallets. They can be used as low-cost data carriers for large volumes of data such as shipment container and/or multipack content with full TCMD/stock number/document number level of detail.

AIT ENHANCEMENTS FOR DISTRIBUTION

6-46. AIT can enhance distribution in many ways. It has the capability for automating source data to minimize human intervention and improve accuracy. In turn, this will improve future processing and documentation. AIT can be used for automating the reporting of events that occur in the distribution system (such as arrivals and departures of shipments at key nodes in the system), locating and identifying major end items and intensely managed supply items, and tracking the contents of containers.

6-47. Specific theater distribution AIT applications currently in use or anticipated in the future include the following:

- Use of laser cards for automated manifest/packing list. The shipping activity (depot or SSA) will read the bar coded information on the individual MRO as the items are placed in the multipack. A transportation control number (TCN) will be assigned for multipack. This will establish the relationship between the document numbers of the items in the box and the TCN assigned to the multipack. This automated manifest/packing list information will be recorded on a laser card. It will also be reported to a central TAV/ITV database for access by various managers. The laser card will travel with its multipack either inside the multipack or attached to the outside. The laser card will be available for use as automated source data at the consolidation and containerization point (CCP) (as source data for container tagging with RF tags) and at the ultimate SSA (for receipt processing).
- Use of RF tags to carry transportation control and movement document (TCMD) and content information for shipments. There will be a RF tag attached to the outside of each shipping container. This tag will be loaded at the CCP with TCMD information for the container. In addition to TCMD information (TCN, container identification number, ship-to address, and so on), the tag will include information about the contents of the container (such as stock numbers, document numbers, shelf life, hazardous materiel codes, and special handling requirements). The automated manifest/packing list

laser card traveling with each multipack will be used as source data for the tag, thus ensuring accurate data with no requirement for manual input. Although the information is the same as that recorded on the laser card, the uses are somewhat different. The laser card must be physically inserted into a reader to access the information. The RF tag provides "hands off" information and has many potential uses as explained below.

- Use of RF tags to locate and identify contents of containers. Fixed and/or hand-held RF interrogators can be used at various locations within the distribution system to quickly locate specific containers by container identification number or TCN. RF tags and interrogators can also be used to identify the contents of containers without opening them.
- Use of RF tags to ensure shipments are properly processed. RF interrogators will be placed at appropriate locations so that the supply and/or transportation AIS used at these locations are automatically updated with the date and time when the tagged shipment arrives. The system can be designed to check periodically on items within the range of the interrogators and to notify managers when the items have not been properly processed within an established timeframe. This procedure can be employed at key locations in the distribution pipeline such as the CCP, POE, POD, SSA, or distribution terminal (DT).
- Use of RF tags to improve management of frustrated cargo. Fixed or hand-held interrogators can be used at the POE, POD, DT, or trailer transfer point (TTP) to capture detailed information about frustrated cargo. This information can be quickly and accurately uploaded from the RF tag attached to the container. It can be entered into a local (or regional) database so that it can be reviewed in an automated manner. It can then be re-routed to the correct consignee with a new RF tag.
- Use of RF tags to automatically and remotely modify ship-to address, consignee, or other cargo disposition instructions. Fixed interrogators located throughout the distribution system will provide the capability to intercept and redirect shipments. The automated systems at the CCP, POE, POD, TTP, or DT can be programmed to look for specific containers (or all containers addressed to a specific consignee) and automatically modify the disposition instructions of the TCMD or other automated manifest documentation.

- Use of RF tags for unit equipment in deployment operations. When embedded in AIS such as TC-AIMS II, AIT will produce unit deployment data on tagged vehicles and unit equipment derived from the automated unit equipment list (AUEL). The movement of unit equipment can then be monitored throughout the deployment via the same interrogator network that will be used to monitor ITV for sustaining cargo. The tag, when used as source data automation for aerial and surface ports, can also act as the advance movement documentation upon arrival at the ports and be used to create the cargo manifest. The stand-off interrogation capability will also enhance the management of port operations and staging areas.
- Use of RF tags to help manage pre-positioned materiel. Tags on pre-positioned materiel ashore and afloat can help provide a means of managing, controlling, and issuing equipment to units. RF tags on these

items will allow "hands off" inventory management and allow operators to know exactly what materiel and equipment has arrived without the laborious task of scanning thousands of bar codes. AIT also offers the potential to manage staging areas with limited soldiers and paperless issuing of equipment to units.

- Use of RF tags in materiel accounting. RF interrogator networks can be established at storage area entrances and exits to capture materiel arrival and departure data. When linked to the proper AIS, the tags can provide automatic credit and debit transactions for supply operations. This capability can also perform remote and stand-off inventory functions.
- Use of RF tags in locating materiel. RF tags can be used to report their locations to local users with hand-held interrogators at busy or crowded ports, staging areas, or ammunition storage points. The desired item can be queried from the hand-held interrogator using NSN, document number, or generic name (such as "tire" or "barbed wire"). Only tagged containers with these items will respond. The "beeping" tags or the interrogator's location finding functions can be used to locate the container and item.

SECTION II. - COMMUNICATIONS

6-48. Relevant distribution information must be quickly and accurately distributed to elements within the distribution system. The interconnectivity of various information systems within the overall distribution system is critical. Communications must provide reliable connectivity for a seamless flow of information throughout the strategic, operational, and tactical continuum.

6-49. In a typical, forward-deployed theater of operations, as the transition from peace to war begins, storage and maintenance areas at both theater and corps continue operating from their peacetime, fixed locations. Communications support continues its reliance on garrison and strategic systems. In the early stages of operations in such theaters, some tactical communications support will be available. On the other hand, in a contingency theater of operations, communications support will be very austere, relying on a mix of tactical and local indigenous communications systems. As the theater matures, in both a forward-deployed or contingency theater, tactical communications systems will provide the majority of communications support.

6-50. Today, distribution operations depend heavily on the area common user system (ACUS) which consists of the COMMZ Tri-Services Tactical (TRI-TAC) and Mobile Subscriber Equipment (MSE) systems. Figure 6-7 illustrates the configurations for tactical connectivity. For operations within the brigade area, the tactical internet (TI) provides connectivity between the brigade and STAMIS. However, commercial satellite communications may be required to augment these primary tactical communications systems. Future communications technologies, such as global cellular systems, low earth orbit satellites, and the joint tactical radio (JTR), will be evaluated as they mature for possible inclusion in the systems architecture to satisfy distribution operations requirements. See Figure 6-8.

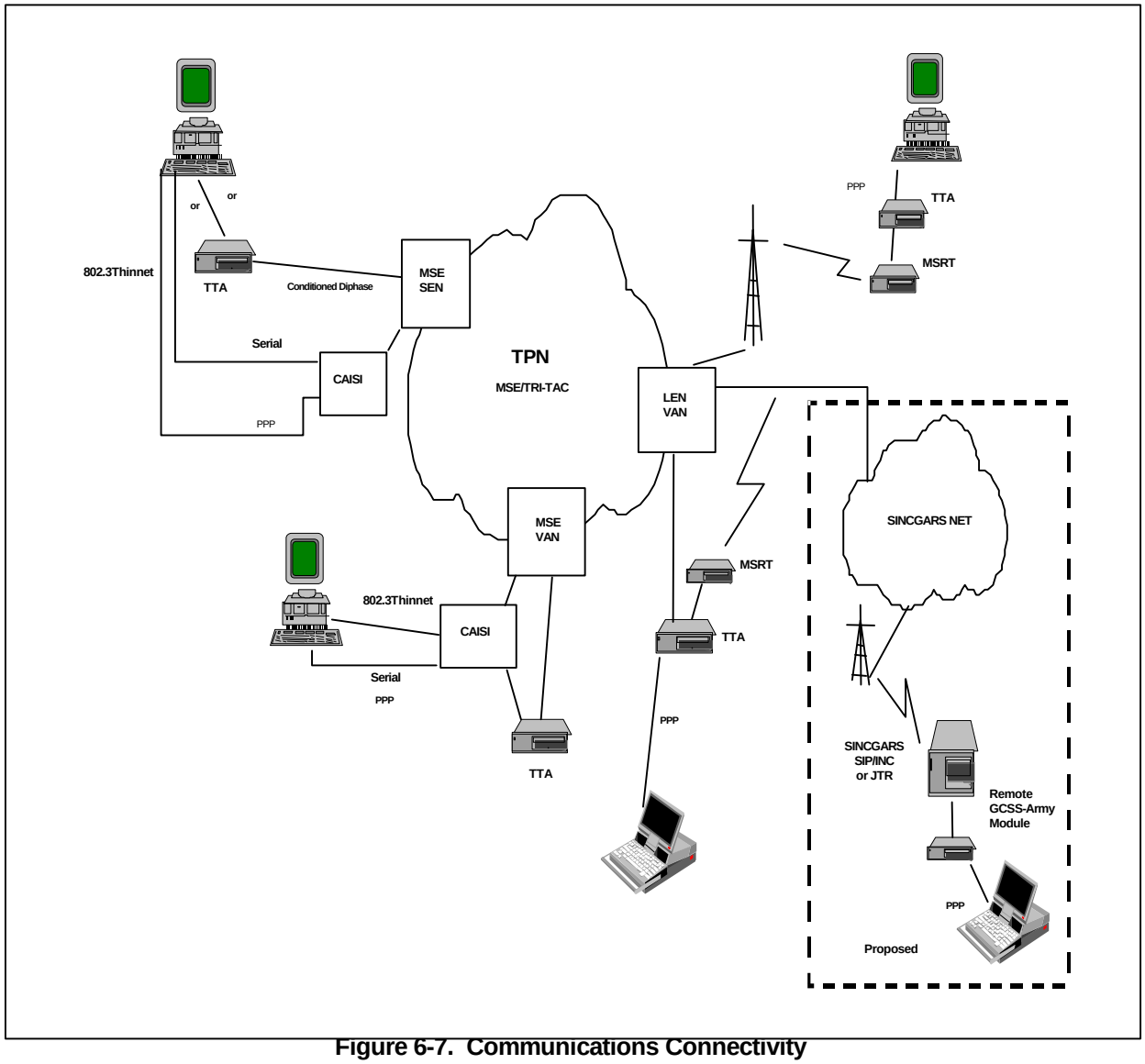

Figure 6-7. Communications Connectivity

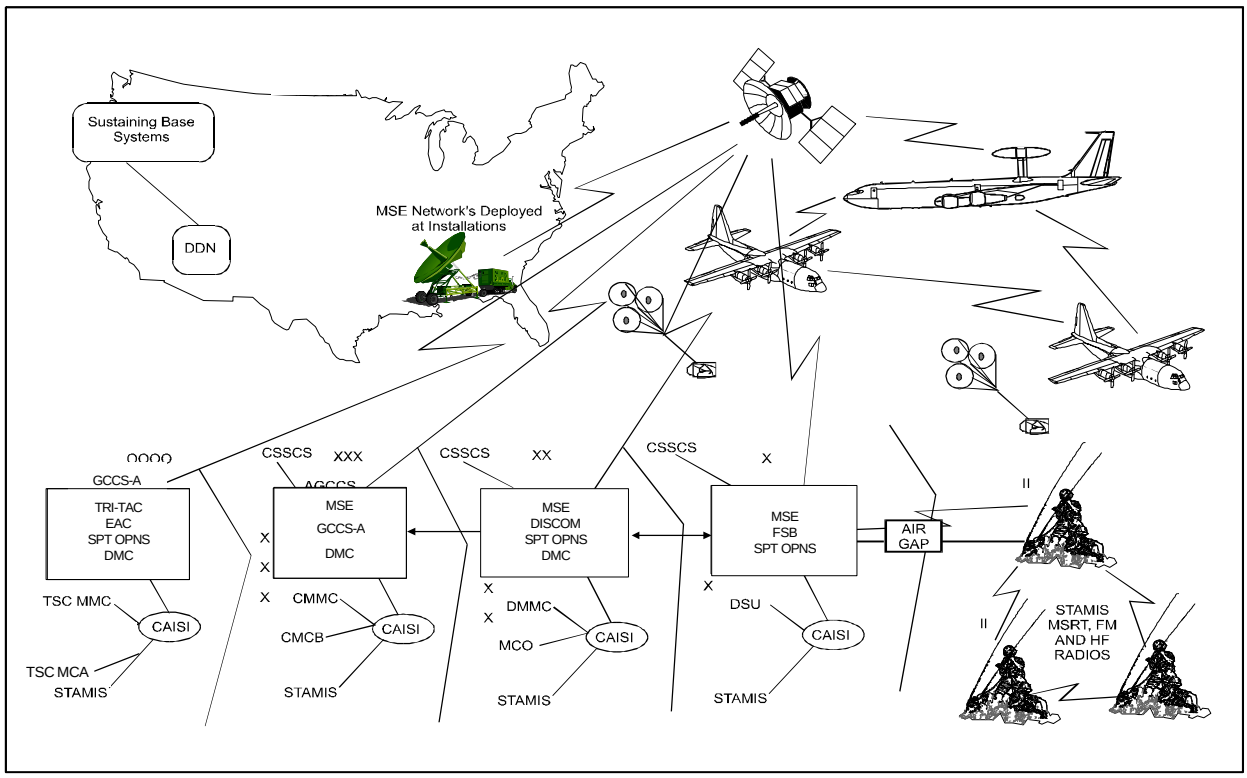

Figure 6-8. CSS Communications Architecture

AREA COMMON USER SYSTEM (ACUS)

6-51. Today, the ACUS is a digital battlefield telecommunications system composed of switching, transmission, network control, TRI-TAC, and MSE subscriber and terminal equipment. ACUS provides access for static or mobile subscribers and interfaces with strategic voice and data systems. MSE extends from the division maneuver battalion rear area back to the corps rear boundary. Fully interoperable, automated, secure voice, and data connectivity with EAC is provided by TRI-TAC systems. Although ACUS was designed to handle primarily voice traffic, both TRI-TAC and MSE include a packet switch network overlay to the voice network called tactical packet network (TPN). The TPN has no impact on voice grade of service and is used by large volume STAMIS to transfer data. Connection to the circuit switch (voice) may be allowed for low volume users. MSE also provides long-range, hard-copy communications capability through a communications terminal or by fax. In the future, the tactical defense messaging system (TDMS) will provide a standards-based, secure worldwide electronic messaging capability to support garrison and battlefield environments.

6-52. Signal units establish the network and maintain the system to the junction box or access point at a small extension node (SEN) switch. Subscribers connect to the system by using equipment organic to the unit or by laying wire to a junction box connected to a SEN switch or radio access unit (RAU). They are also responsible for the installation, operation, and

maintenance of organic subscriber equipment. The CSS automated information system interface (CAISI) device can be used as an interface device between both the circuit and packet sides of the MSE similar to how a terminal server works on the not classified but sensitive internet protocol router network (NIPRNET).

6-53. There are several methods to access the circuit (voice) switched network. Users may gain access to the circuit switch with physical connections to a digital non-secure voice terminal (DNVT), digital subscriber voice terminal (DSVT), mobile subscriber radiotelephone terminal (MSRT), tactical terminal adapter (TTA), or CAISI. Data communications using the circuit switch will require the local commander's permission.

TACTICAL PACKET NETWORK

6-54. TPN is the packet overlay to the MSE and TRI-TAC communication systems. It provides comprehensive network services for users of secret information from brigade up through EAC. TPN provides services such as automatic internet protocol (IP) address assignment and address resolution. At this time, none of the network services provided by TPN are available to unclassified users.

6-55. The NIPRNET is the Defense Information Systems Agency (DISA) backbone IP router network which provides service to unclassified users. Service-specific local area networks (LANs) tie into the NIPRNET backbone. The NIPRNET is connected via routers to the civilian internet. In terms of the unclassified packet network (UCPN), once a reachback (discussed below) is established, tactical unclassified users can access resources on or through the NIPRNET.

6-56. The secret internet protocol router network (SIPRNET) is the DISA backbone network that supports secret-level users. Like NIPRNET, Service-specific networks tie into the SIPRNET backbone. In the case of SIPRNET, the LANs operate at the secret level. Since the TPN is a secret high network, it can be connected to the SIPRNET to allow command and control and other secret information to be passed between deployed units and fixed strategic sites.

6-57. TPN is accredited at the secret systems high level. Most CSS STAMIS are sensitive but unclassified (SBU). Physical connectivity of STAMIS to the TPN is through the CAISI device. CAISI's design is based upon the requirement that STAMIS must communicate on the battlefield using the supplied TPN. CAISI and other unclassified transmission control protocol/internet protocol (TCP/IP) capable hosts cannot connect directly to the TPN. As a result, a methodology is required to separate the unclassified hosts from those of higher classification. In addition, STAMIS require the ability to reach the NIPRNET from the battlefield. This imposes additional security problems with the possibility of attack from the NIPRNET/internet to disrupt service to the TPN. To resolve these problems, a device known as a network encryption system (NES) is positioned between the unclassified TPN users and the connectivity points to the MSE/TRI-TAC network and before the point of entry to the NIPRNET gateway (Figure 6-9).

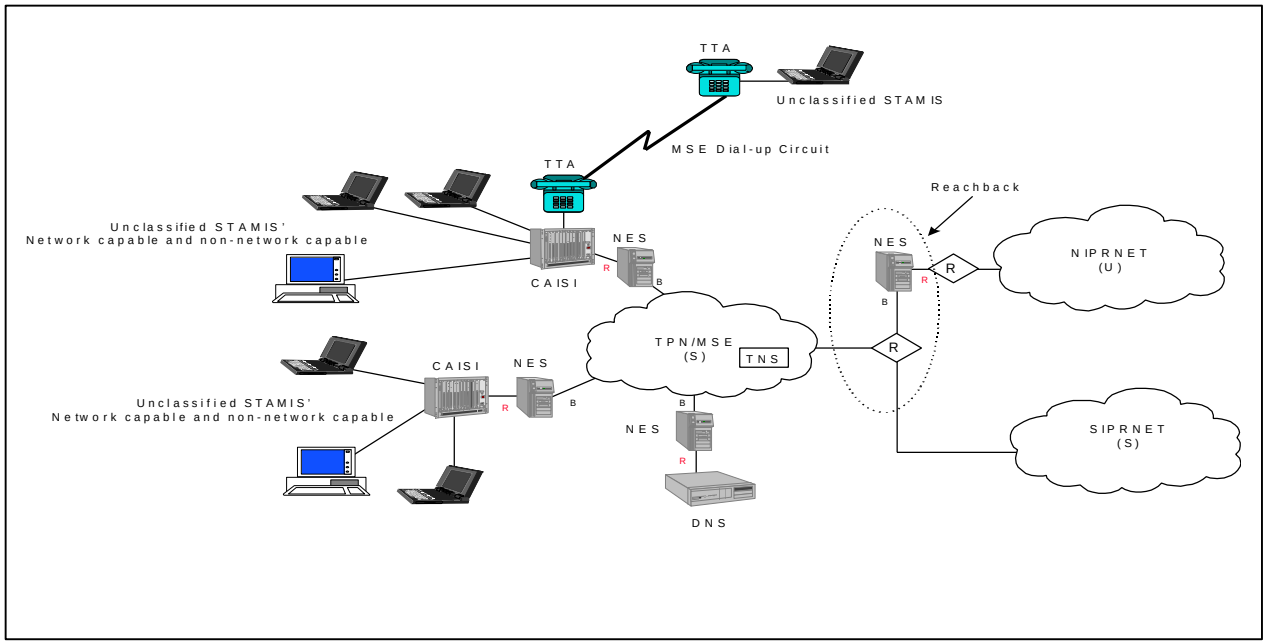

Figure 6-9. UCPN Structure

NETWORK ENCRYPTION SYSTEM

6-58. The NES is an in-line packet encryption device. In the UCPN, the NES allows users behind the NES to communicate with each other but will block communications with any user directly connected to the TPN. The unclassified data is encrypted before entering the TPN allowing it to tunnel through the secret network without becoming "contaminated" by secret data. The NES also prevents secret data from being misrouted to the unclassified enclaves. The NES is configured so that all deployed unclassified enclaves can communicate with each other as well as with systems connected to NIPRNET. The overall effect is that both the secret and unclassified networks coexist on the same backbone but are separated. Systems and networks directly connected to TPN cannot communicate with systems and networks connected to the UCPN (RED side of the NES). The NES is owned, operated and maintained by signal brigades and battalions. At corps and below, one NES is fielded per CAISI device.

COMBAT SERVICE SUPPORT AUTOMATED INFORMATION SYSTEMS INTERFACE

6-59. The CAISI is a commercial off-the-shelf (COTS)/ non-developmental item (NDI) device that offers an integrated approach to providing network connections to both STAMIS hosts and client systems. It is an interface device which provides network connectivity for STAMIS owned by CSS units, primarily in a tactical environment. The CAISI is a user-owned and operated system that allows STAMIS to exchange information via both tactical and commercial communications networks. CAISI concentrates dispersed STAMIS users at a central entry point to maximize existing connections to the TPN.

6-60. CAISI is both hardware and software and will support two classes of users: (1) systems which are inherently network capable and implement TCP/IP and (2) legacy systems. Support for legacy systems is provided by the virtual end-to-end (VEE) application. The VEE application provides connectivity through packet networks in a manner that simulates the point-to-point connectivity currently employed by most CSS automated systems. VEE interfaces with Military Communications Networks (MCNs), that is, MSE, TRI-TAC Communication, Defense Data Network (DDN), and Defense Switching Network (DSN), and with US Public Switched Networks and commercial communications systems of nations with which the US has defense agreements.

WARFIGHTER INFORMATION NETWORK (WIN)

6-61. The ATCCS described earlier in this chapter will rely on the Warfighter Information Network (WIN). WIN is an evolving integrated C4 network that is comprised of commercially-based, high technology information and communications systems. It is designed to increase the capacity and velocity of information distribution throughout the area of operations in order to gain information dominance. WIN will support the warfighter in the 21st Century with the means to provide sustaining base information services to deployed units. WIN will maximize secure information services for the warfighter and support the power projection force from sustaining base to foxhole.

6-62. WIN is a network of information and communications services that provides support to the ABCS. It is comprised of seven component threads. They are:

- Power projection/sustaining base.
- Tactical internet/combat net radio.
- Satellite transport.
- Information systems.
- Information services.
- Terrestrial transport.
- Network management.

6-63. WIN is the C4 network that supports all battlefield functional areas (BFAs). Several of these components important for distribution managers and operators to understand are discussed below.

POWER PROJECTION/SUSTAINING BASE

6-64. Future operations should not require the physical movement of sustaining base functions to the theater. A key element in the distribution requirement is the ability to provide sustaining base services to the foxhole. This can only be accomplished if there is a seamless connection from the sustaining base through the defense information switching network (DISN) transport layer and into the theater information infrastructure. The DISN transport layer provides the strategic information systems infrastructure linking fixed installations worldwide. The goals of the power projection/sustaining base (PPSB) component of WIN are:

- To upgrade the post, camp, and station information systems infrastructure to provide the seamless connection into the DISN transport layer. These upgrades are being performed under the Power Projection C4I (P2C4I) program.
- To ensure that the application layer (hardware and software) in garrison and at the sustaining base will "plug and play" with the battlefield through the WIN transport layer.
- To help the Army define the requirements of power projection platforms in support of sustaining base operations.

6-65. PPSB infrastructures will provide the gateways and the information support for split-base operations. Infrastructure upgrades needed to make this a reality include fiber optics, standardized gateways, and asynchronous transfer mode (ATM) switches. Commercial technology used at PPSB and standardized tactical entry point (STEP) locations will allow forces to use the same telephones or personal computers in the field that they use in garrison. It will also provide standardized access to strategic infrastructure services such as the DISN, NIPRNET, and SIPRNET. Infrastructure improvements will enable power projection through the quick transmission of mobilization and movement control information.

6-66. Each installation must be examined to ensure that all functional area requirements are met in support of split-base operations. Contingency requirements must be identified and matrixed against current installation C4I capabilities. All contributing commands must evaluate the peak requirements and plan accordingly. The C4I installation infrastructure requires long range planning for resourcing and execution, with all functional areas providing requirement input. See Figure 6-10.

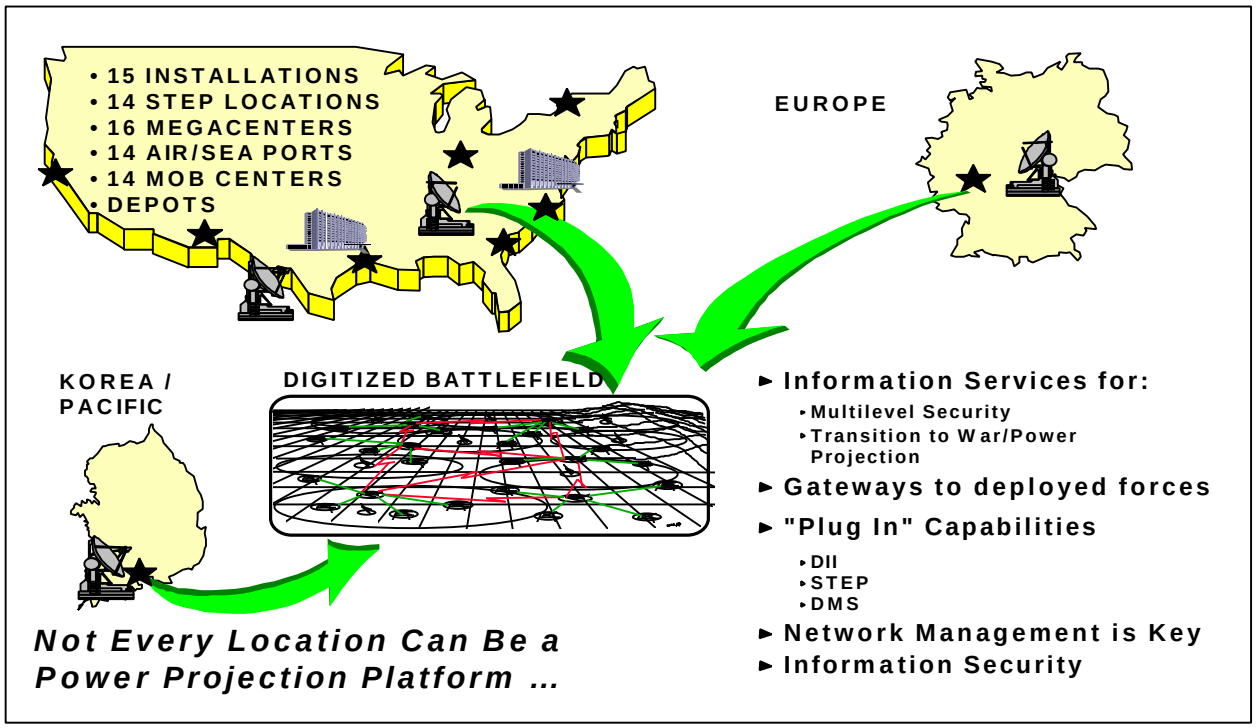

Figure 6-10. Power Projection Platforms

6-67. P2C4I programs have been established to ensure the Army's sustaining bases are integrated into the WIN architecture. This allows for a seamless "plug in" capability from the deployed force to the sustaining base by upgrading the telecommunications infrastructure at designated power projection sites. Resourcing and implementation of the four P2C4I components (switching, gateways, Common User Installation Transport Network, and Outside Cable Rehabilitation) will ensure a sustaining base infrastructure exists to support the expanded WIN battlespace.

6-68. The demarcation between the strategic layers of the DISN and the tactical layer is the STEP. The STEP provides the link, both secure and non-secure, from the theater to the DISN. The deployed force will link into one of 14 worldwide STEP locations for out-of-theater connectivity. The DISN transport layer, using the STEP as an entry point, is the means by which battlefield information is transported to the sustaining base. The transport layer consists of both satellite and terrestrial systems.

6-69. The Defense Message System (DMS) consists of the hardware, software, procedures, standards, facilities, training, support and personnel used to exchange messages electronically between organizations and between individuals in the DoD. In addition, the DMS will support interfaces to systems of other government agencies, allies, and defense contractors. DMS will replace the Automatic Digital Network (AUTODIN) and E-mail messaging systems used today.

TACTICAL INTERNET

6-70. At brigade and below, the TI will extend the ABCS to the soldier and weapons platform. The TI passes battle command and situation awareness data. The TI must provide tactical, mobile, simultaneous multi-band, multi-mode, voice and data (and possibly video) communications while providing routing and network services. The TI must support the exchange of secret and unclassified data. The TI, as referred to here, is used to describe the communication pathways only. It utilizes the Tactical Multinet Gateway (TMG) which interfaces with the data server to provide connectivity to the WIN data network.

6-71. The TI requires a network, not just a radio designed to support known and emerging requirements. Today it integrates the legacy Single Channel Ground and Airborne Radio Systems (SINCGARS) and Enhanced Position and Location Reporting System (EPLRS) radio. In the future, JTR will be a networked, multi-wave form, multiband radio system employed to provide the TI backbone that supports voice and high data throughput. JTR will support existing and planned information systems at brigade and below including ATCCS, FBCB2 and STAMIS information where the ACUS is unable to provide support.

Current Combat Net Radio

6-72. The CNR architecture includes SINCGARS; amplitude modulated (AM) high frequency (HF) radios; and single channel tactical satellite (TACSAT) radio systems. In the future, JTR will replace each of these CNR systems.

Although the range of frequency modulation (FM) very high frequency (VHF) radios is limited, HF and TACSAT radios can extend transmission ranges over hundreds and thousands of kilometers, respectively.

6-73. SINCGARS radios are portable and mobile. They can be used on the move more easily than other CNR systems. High frequency AM radios extend ranges beyond those possible with VHF radios, such as SINCGARS. Single-channel TACSAT radios use ultra high frequency (UHF) and extremely high frequency (EHF) to carry both single-channel voice and data traffic globally, virtually eliminating distance constraints inherent in other CNR systems.

6-74. EPLRS provides the wide area network (WAN) connectivity from platoon-level to brigade and between brigade and battalion autonomous systems and routing areas (RAs). Operational units are equipped with EPLRS very high speed integrated circuit radio sets to establish and maintain a tactical WAN backbone for the TI. The radio set provides secure, jam-resistant digital communications and accurate position location capabilities for the user. It also provides retransmission capabilities that are transparent to the user. The maximum distance the EPLRS can cover is based on an average distance of three to 10 kilometers between each radio and the maximum number of relays in the link. The interface between SINCGARS, FBCB2, internet controller (INC), and the EPLRS will be internet protocol (IP) compliant.

Joint Tactical Radio

6-75. JTR will provide a means for transport of information exchange requirements (IERs) between users throughout the theater. Various configurations of JTRs will support IERs extending from low capacity local voice or data nets to high capacity video links or WANs covering large areas such as brigade, division, corps, and theater. The JTR family of radios will serve as a means to simultaneously operate across multiple frequency bands. It will operate simultaneously across multiple voice, data, or video networks to exchange information between users throughout the battlefield. The key function of JTR will be to serve as the information transport backbone for the tactical internet at echelons brigade and below. The JTR system will allow operation of multiple applications simultaneously from a single radio unit. The future digital radio (FDR) concept will replace all other combat tactical radios to include SINCGARS, MSRT, HF sets, EPLRS, satellite communications (SATCOM), GPS, and others.

SATELLITE TRANSPORT SYSTEMS

6-76. SATCOM is often the primary communications means available to support US military operations in a global threat environment of regional conflicts that are unpredictable in location, time, duration, and intensity.

Types of Systems

6-77. WIN will use a variety of space segment assets for communications. Each space segment and the frequency band offers advantages and disadvantages. The UHF band offers single channel assess at low data rates (16 kilobytes) with no anti-jam (AJ) capability but is characterized by small, inexpensive ground terminals. The UHF band also allows for the implementation of demand assigned multiple access (DAMA). Super high frequency (SHF) offers greater throughput for users but provides limited protection. Competition for SHF band access is increasing, making access authorization difficult to obtain. The Military Strategic and Tactical Relay Satellite (MILSTAR) program provides the newest space segment. MILSTAR EHF provides well-protected communications by using low probability of intercept (LPI) and low probability of detection (LPD) technologies combined with AJ capabilities. Commercial SATCOM, using portions of the SHF band, provides surge capability when military systems are saturated.

6-78. Military satellite communication systems include the Defense Satellite Communications System (DSCS), MILSTAR EHF, and Tactical Satellite Communications (TACSAT) systems. Other modernization efforts described include Global Broadcast Service (GBS) and the Global Positioning System (GPS). GBS provides tailored, multi-media, intelligence broadcast service, while GPS remains the Army's primary navigational aid. A proper mix of military and commercial satellite systems are necessary to meet the requirements of a force projection Army. This mix will balance the capabilities and limitations of the various assets (Figure 6-11).

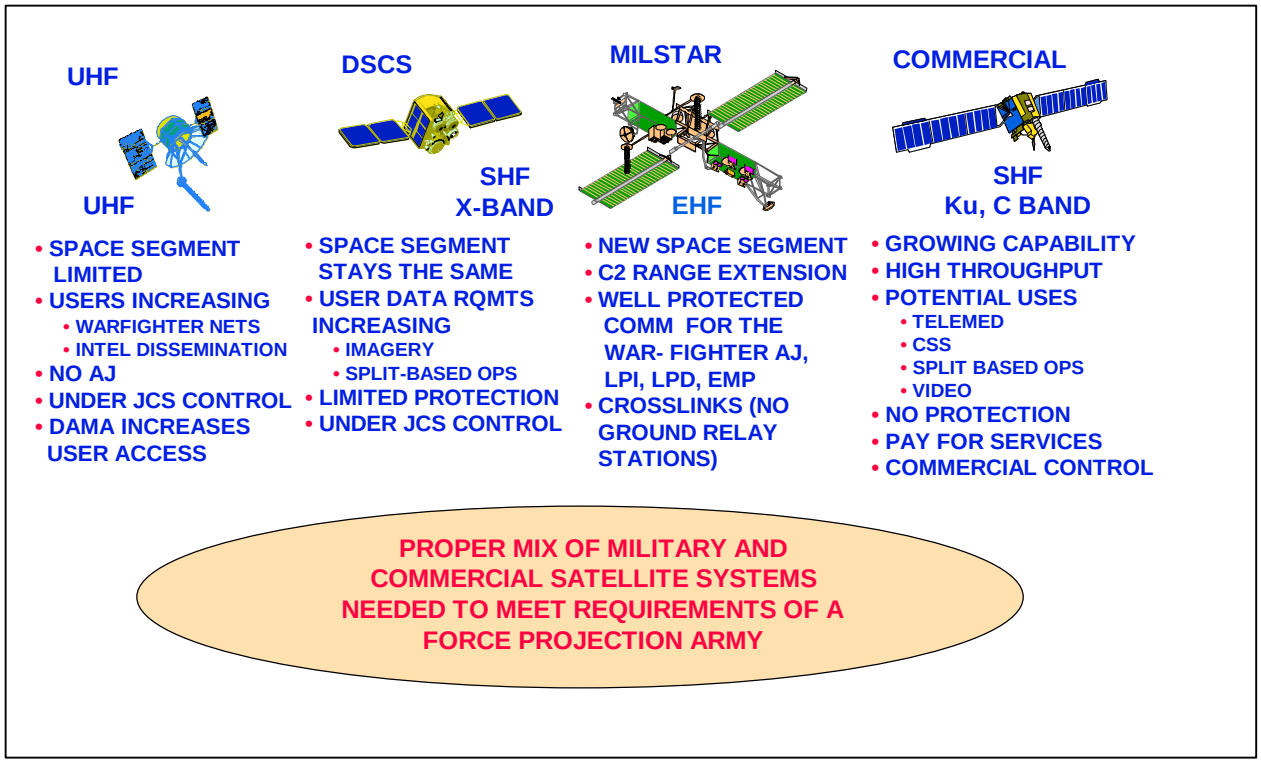

Figure 6-11. Space Segment Capabilities

6-79. Single channel SATCOM is primarily low data rate communications. Single channel space and ground terminal segments are characterized by increased terminal availability, low cost, and ease of mobility. They can network with multiple users, communicate on the move, and penetrate foliage while on the ground. However, UHF single channel SATCOM access is extremely restricted, has limited information throughput, and has no anti-jam capability.

Global Broadcast Service

6-80. GBS is an evolving secure, integrated satellite broadcast service and information dissemination system based on commercial and high technology developments. GBS increases the capacity and velocity of information distribution. As a component of the WIN, GBS augments current space and terrestrial transport systems through one-way transmission.

6-81. GBS exploits commercial developments in the direct-to-home broadcast service industry. Because of the low cost, small size, and mobility, GBS will be fielded to combat, combat support, CSS units at all echelons down to battalion level. The receiver terminals will consist of a small antenna system and a GBS receiver. GBS terminals would be capable of operating on board aircraft, ships, and vehicles.

6-82. GBS provides a real-time, continuous means to receive, access, retrieve, and archive battle command information. The information can come from national/strategic sources or from theater level. Information products can be video broadcasts, unmanned aerial vehicle (UAV) video, common ground station sensor data, or other large volume data product. A few of the potential types of information that may enhance distribution operations are:

- Movement control information.
- Air tasking orders.
- Weather data.
- Intelligence briefings/files.
- UAV and satellite imagery.
- Logistics files.
- Commander's intent briefings.
- Operations orders and overlays.
- Nuclear, biological, chemical (NBC) status, warnings, and operational information.
- Civil affairs and psychological operational information.
- Software/databases.
- Morale/welfare information.
- Information from national sources and archives.

6-83. At each echelon the user can define the type of information he needs and when he needs it. Users at GBS terminals will set profiles that define the time, area, and type of information they want to receive through the GBS system. They can also submit queries/requests for specific data.

WARFIGHTER INFORMATION NETWORK - TERRESTRIAL (WIN-T)

6-84. WIN-T will replace the current ACUS (MSE and TRI-TAC) systems in EAC, corps, and division. It will be deployed within the theater, corps, and division, down to maneuver brigade and separate maneuver battalion command posts (CPs). Commonality of equipment at all levels will facilitate the formulation and use of task forces as fighting or supporting units.

6-85. Terrestrial transport systems are the backbone of the WIN architecture. They provide simultaneous voice, data, imagery, and video communication services at all levels of security. Terrestrial transport systems will provide higher capacity and faster velocity by integrating ATM protocols, embedded integrated services data network (ISDN) services, wideband high-capacity radios, network services, and access to personal communications services (PCS) cellular sites. Some of the network services provided will be multimedia, wireless LAN, command post PCS cellular services, automatic dial-up video teleconferencing, multi-level security, and ISDN ethernet gateway for remote users.

6-86. ATM backbone and extension switches with ISDN technology and high-capacity line of sight (HCLOS) radios will provide the velocity and throughput necessary to support information requirements. The HCLOS will serve as the next-generation line-of-sight (LOS) radio for the Army's TRI-TAC and MSE.

6-87. Each WIN switch will provide wireless data access via wireless LAN (WLAN) or by a wireless modem embedded in the JTR. The WLAN, supported by all WIN switches, will be the primary wireless access point for the majority of wireless users to the data network. These WLANs will provide at least three megabytes of throughput capability at distances up to three kilometers. Host subscribers at battalion and below will access the WIN via the tactical internet.

Personal Communications Services

6-88. Personal communications services (PCS) is an evolving integrated wireless communications service based on commercial cellular and mobile telephone technology. As a component of the WIN infrastructure, PCS will provide seamless mobile secure communications service throughout the battlespace. A secure personal communicator (cellular telephone equipped with a communication security (COMSEC) device) will access the PCS transport architecture. The WIN PCS will employ commercial wireless technology and services to support information transport and dissemination needs.

6-89. PCS will provide users with a high probability of system access and secure end-to-end communications. Desired capabilities also include conference calling and net radio operations. To support the highly mobile users, the end-user communications equipment must be extremely small and lightweight. The service must be capable of providing secure communications service with a minimum land based infrastructure, while providing global connectivity for real-time voice and low rate data communications and direct connectivity to the Public Switched Telephone Network (PSTN) and the DISN.

Wireless Local Area Networks

6-90. A major terrestrial transport component of WIN is the WLAN. WLAN will support information needs of highly mobile and distributed users through adaptation to military tactical communications systems and commercial wireless technology. The WLAN will assist in providing mobile and flexible CPs and enhancing C2 on the move.

6-91. A WLAN creates a more mobile environment for a host data user, it is quicker to install, and it may lower the LAN maintenance costs associated with constant rewiring. WLANs will provide at least three megabytes per second of throughput capability at distances up to three kilometers. However, the limitations of distance and bandwidth will lower the performance below that of a hard-wired system and may be subject to interference. Integrity and security of the data will always be a major security concern when dealing with a wireless system. Additional limitations include interoperability with different vendors and costs.

6-92. The WLAN supported by all WIN switches will be the primary wireless access point for the majority of wireless users to the data network. The future small extension node (FSEN) switch will have an embedded JTR. The JTR will provide WLAN access, for users at brigade and below, via the TI to the switched packet network. A wireless modem is embedded in the JTR to meet the WLAN requirements for users below brigade such as CSS users.

GARRISON COMMUNICATIONS

6-93. In CONUS during transition to war and wartime, communications will be the same as peacetime. The existing infrastructure consisting of military and commercial communications networks will be utilized. During peacetime, storage areas and ammunition supply points (ASPs) at theater and corps levels operate from fixed depots or locations. Communications support relies on garrison and strategic communications systems.