

Chapter 9

Other Emerging Maintenance Operations

This chapter continues the discussion about emerging maintenance operations. Critical to the continued evolution of maintenance operations into the next century are the emerging FXXI EAD Maintenance Organizations, the Interim Division, Homeland Defense, and technology-enhanced maintenance enablers.

FORCE XXI EMERGING ECHELONS ABOVE DIVISION MAINTENANCE ORGANIZATIONS

9-1. FXXI Maintenance Organizations at corps and above (EAD) continue to evolve in response to new demands placed on the maintenance system by the transforming Army. Newly designed FXXI EAD maintenance organizations discussed in this chapter include the SMC with modular platoons, the CRC with modular platoons, and the new Collection and Classification Platoons for the EAC Collection and Classification Company. The Theater Army Signal Maintenance Company and the TMDE Support Company/Team are both discussed in detail in Chapter 2, Maintenance Organizations-EAD.

GENERAL EMPLOYMENT CONCEPT

9-2. Current EAD maintenance designs are not flexible and modular enough to complement the transforming Army. The lack of communication and mobility continues to plague anticipatory maintenance operations. To accommodate the changing Army, various EAD maintenance organizations are being redesigned to meet emerging maintenance requirements for a transforming Army.

9-3. Emerging maintenance organizations will be modular and tailorable, producing a reduced footprint. They will have an LSE (plug-in) organization, a split-based capability with centralized management and distribution, and will incorporate multi-skilled soldiers that perform maintenance tasks using the latest technology for prognostics and diagnostics.

9-4. The Corps XXI area of responsibility will expand on the battlefield (by 600 percent) causing the distance from the corps rear to the fighting position to increase by over 200 km. When coupled with a 24-hour operational day, increased emphasis is being placed on the use and mobility of MSTs, prognostics/diagnostics, and enhanced repair capability.

9-5. To enhance maintenance support for the transforming Army, the use of augmented MSTs is evolving to the platoon concept. Therefore, MSTs are built from field maintenance organization and provide discrete and tailored maintenance support to customer units (see Figure 9-1, page 9-2).

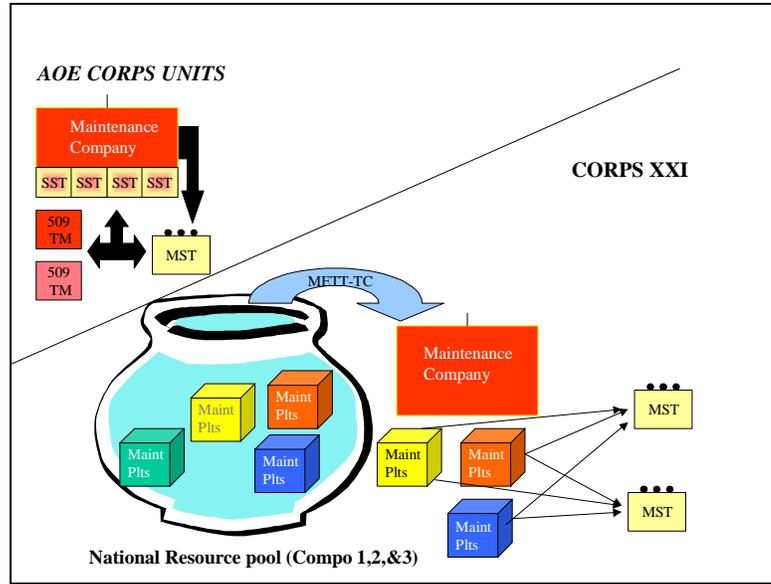


Figure 9-1. Force XXI General Employment Concept

ECHELONS ABOVE DIVISION, SUPPORT MAINTENANCE COMPANY

Mission

9-6. The mission of this company is to command and control assigned cellular platoons, modules, and teams. The company performs field maintenance (on-system repair and replacement) and area recovery operations.

Overview

9-7. The SMC (see Figure 9-2) replaces the non-divisional DS Maintenance Company. The SMC may be found in corps and theater support groups and battalions. The SMC is of modular design, providing for assignment flexibility (at either corps or theater) and has the capacity for attachment of up to 20 civilian personnel. During the conversion from the non-divisional DS Maintenance Company and the Missile Support Company (DS) Corps to the FXXI SME (see Figure 9-3), the Ordnance Force footprint will be reduced by over 3,500 personnel. Also, as a result of overall reduction for the SMC by 30 percent.

9-8. The EAD FXXI SMC design reflects the capabilities of three different maintenance companies (Maintenance Company Non-divisional DS, Missile Support Company DS, and Ordnance Missile Support Company GS (EAC)). It is designed to perform field (on-system) maintenance within the two-level maintenance system. Although designed for EAD operations, the SMC may be employed in the division support area to provide backup maintenance support to division units. Also, separate platoon SRCs permit greater tailoring and MST development (see Figure 9-4, page 9-4). Greater mobility inherent to the maintenance platoons allows the MSTs to move to the breakdown site versus having the customer returning equipment to the support unit. The flexible design also accommodates attachment of Component Repair Platoons, Collection and Classification Mobile Teams, or civilians from the LSE.

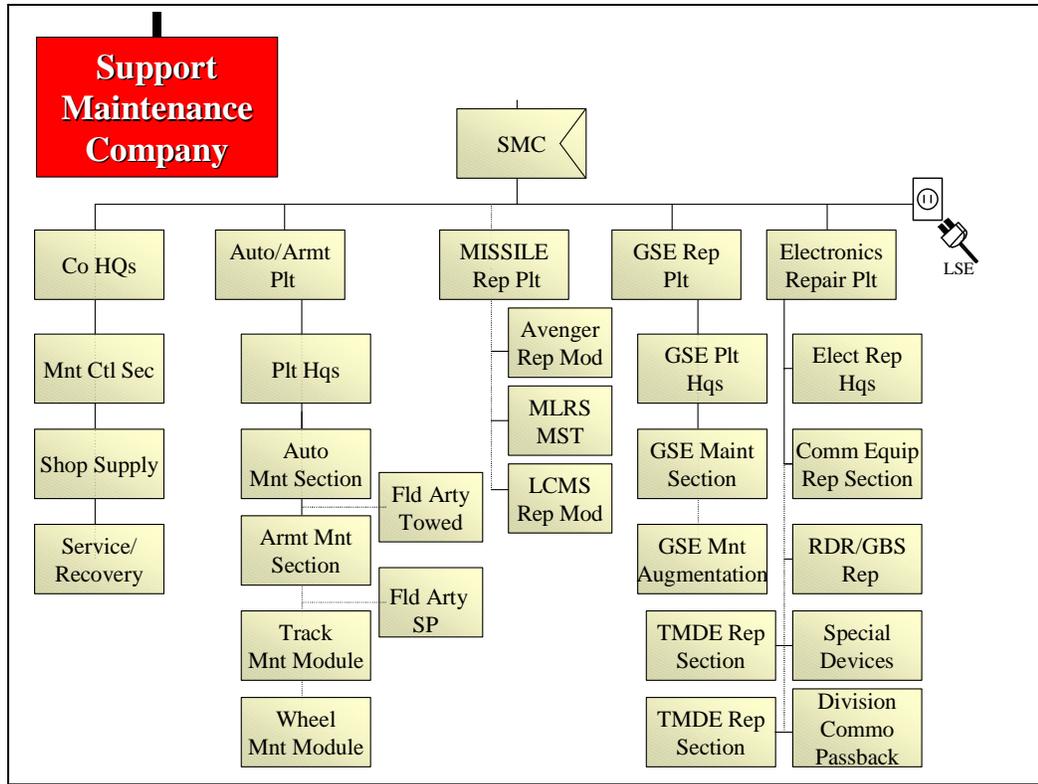


Figure 9-2. Support Maintenance Company

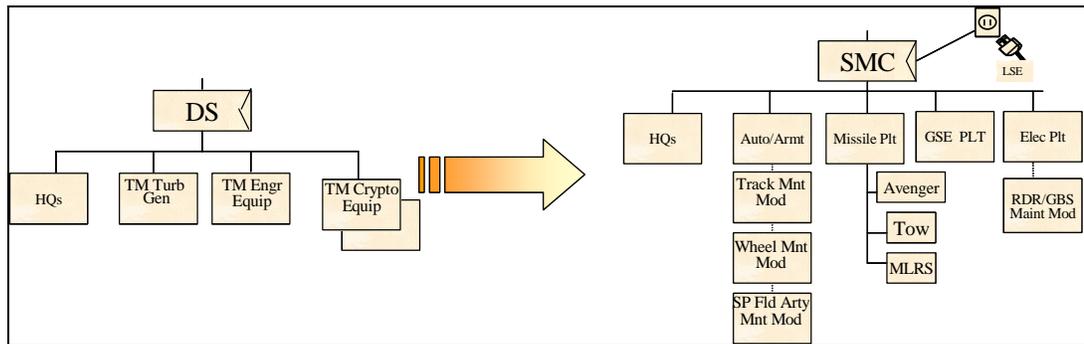


Figure 9-3. Transformation to the Force XXI Corps Redesign Support Maintenance Company

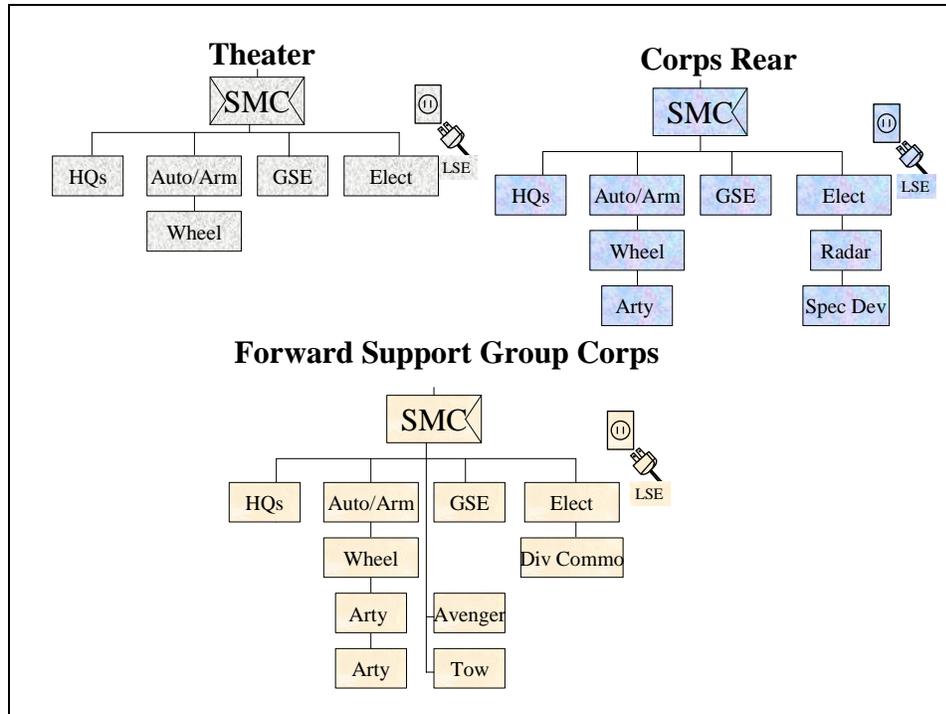


Figure 9-4. Tailoring the SMC for EAD Support

ECHELONS ABOVE DIVISION, COMPONENT REPAIR COMPANY

Mission

9-9. The mission of this company is to perform sustainment maintenance (off-system repair and return to the supply system) repair on components. This unit may be assigned either at corps or theater Army. The CRC has a modular design that permits the attachment with as many as 20 civilians.

Overview

9-10. The CRC repairs components based on a directed workload from the MMC/DMC (see Figure 9-5). This organization has the flexibility to add and remove modules or cells based on the mission. The CRC evolves from the EAC GS Maintenance Company. The SAMS-1 is a maintenance management system which allows the CRC to become a more flexible organization with a primary repair focus on the following:

- Electronic systems (first and foremost).
- Armament systems.
- Automotive systems.
- GSE.

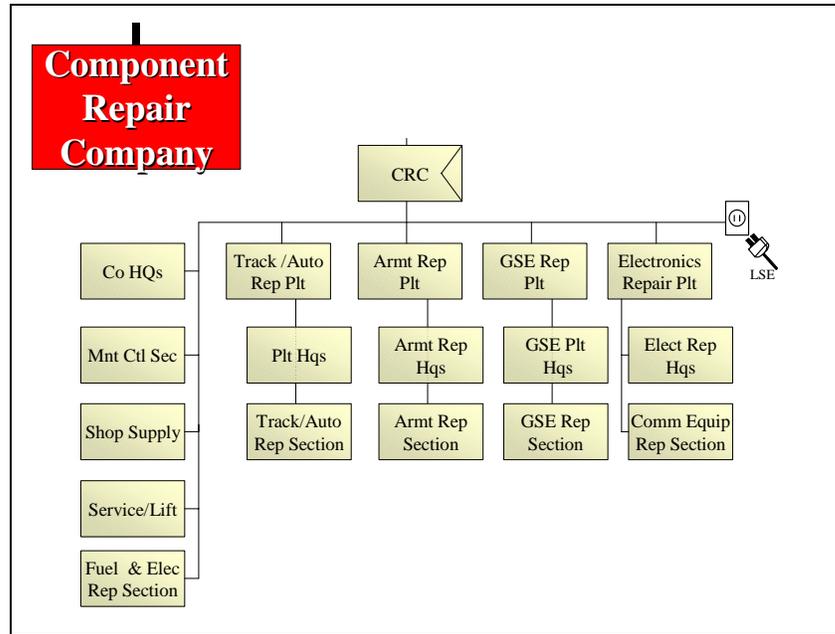


Figure 9-5. Component Repair Company

9-11. The DS Fuel and Electronic Team mission (providing fuel and electronic repair capability DS for the FXXI Heavy Division) also transfers to the CRC. Design accommodations for the CRC will also accommodate attachment (as a plug-in) of the LSE. This unit is designed to perform maintenance operations within the two-level maintenance system at theater and in the rear and forward corps support groups (see Figure 9-6). CRC workloading is expected to be 60 percent performed in the ISB or CONUS, and 40 percent within the operational area.

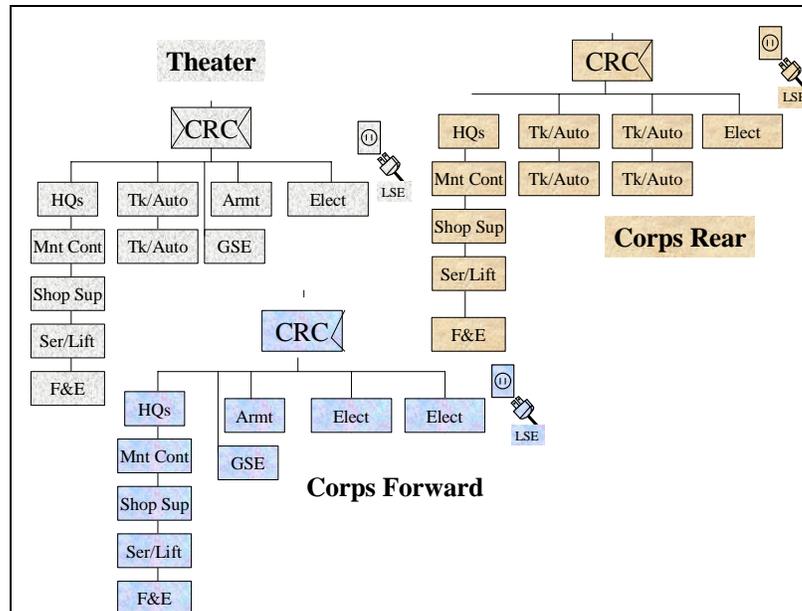


Figure 9-6. Theater and Corps CRC Organizational Designs

ECHELONS ABOVE DIVISION, COLLECTION AND CLASSIFICATION COMPANY

Mission

9-12. The mission of this company is to establish and operate a collection and classification facility. The company will perform the duties of receipt, inspection, segregation, disassembly, preservation, and disposition of serviceable and unserviceable Class VII and IX materiel and similar foreign materiel (except missile systems, aircraft, airdrop equipment, drones, and medical equipment).

Overview

9-13. EAD Collection and Classification Platoons (see Figure 9-7) are added to the existing Collection and Classification Company to assist the DMC to identify and return used LRUs to the distribution system. These platoons receive direction from the COSCOM and theater DMC/MMC managers. These teams may also be attached to a CRC or an SMC, METT-TC dependent (see Figure 9-8). The two Collection and Classification Company Distribution Hub Teams perform vital maintenance inspection functions at distribution hubs along the distribution pipeline for materiel provided by the Collection and Classification Company Weapon System Recovery Teams.

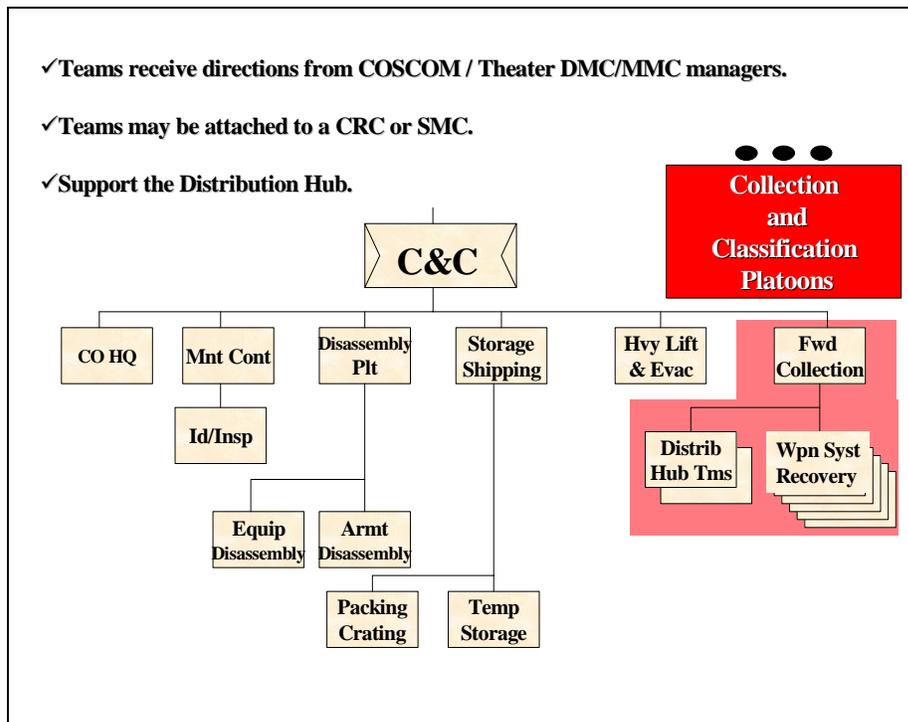


Figure 9-7. Collection and Classification Company

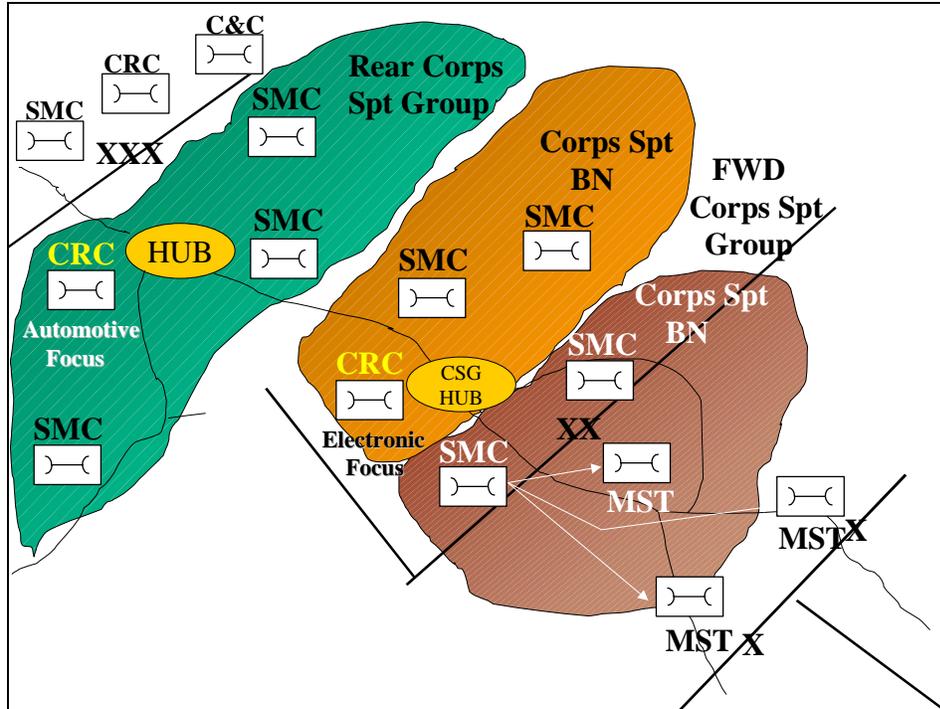


Figure 9-8. Collection and Classification Teams (Attached to SMC or CRC)

9-14. The Collection and Classification Company is assigned at one per theater (no longer one per ASG). The sum total of the redesign and allocation effort will reduce the maintenance footprint by over 1,300 personnel. The following SRCs were eliminated from the force structure:

- TMDE Supply Support Activity (09567LE00).
- Area Calibration Lab Team (09567LF00).
- AN/GSM-268 Support Augmentation Team (09567LD00).

STRYKER MAINTENANCE MANAGEMENT AND DIAGNOSTIC SYSTEM

9-15. The SBCT is designed with an austere support battalion that contains fewer mechanics to support and maintain its vehicles. However, the number of vehicles to support has remained the same even though the number of mechanics has been reduced by two-thirds. As a result, the SBCT cannot afford the luxury of maintainers performing all diagnostics, parts requisitioning, and repairs. Instead, vehicle crewmembers will need to absorb many of the maintenance tasks formerly accomplished by traditional maintenance personnel. Therefore, crew maintainers must use on-board diagnostic information, IETMs, and remote maintenance assistance to effectively and efficiently conduct platform maintenance procedures.

9-16. An on-board, ruggedized, hardened, weather-resistant, compact and portable Maintenance Management and Diagnostic System (MMDS), capable of operating independent of vehicle power, will be installed on all Stryker systems. The MMDS will be capable of hosting standard Army maintenance and related logistics applications that enable the following capabilities:

- Health check/preventive maintenance management (PMM).
- Logistics and maintenance management.
- IETMs.
- Digital preventive maintenance checks and services (DPMCS).
- Stryker crew diagnostics and repair parts requisitioning.
- Stryker maintainer diagnostics and repair parts requisitioning.
- Maintainer's Remote Logistics Network (MRLN).
- Automated logbooks.
- Embedded maintenance training.
- Automatic identification technology/Automatic information data collection (AIT/AIDC) data retrieval.
- Legacy system diagnostics.
- Use of automated CSS information management systems (such as personnel administration, unit supply, and so on) when vehicle is parked and MMDS is not being used for logistics information control function.
- Configuration of database algorithm to support targeted overhaul and condition-based maintenance.

9-17. The MMDS significantly expedites maintenance task accomplishment by replacing many time-consuming tasks (such as diagnostics and manual record keeping) with an automated "single logistics box" approach that integrates parallel logistics functions. MMDS also serves as a tool for fleet management by providing a means to interface with other logistics systems, such as ULLS and SAMS. It also allows for an archival repository for platform-specific historical maintenance management information to support targeted overhauls and condition-based maintenance functions.

9-18. Stryker crews and field maintainers have access to information in the MMDS through the use of a wireless, "touchpad" color display. This display is ruggedized, detachable, hardened, weather-resistant, oil resistant, sunlight readable, and light discipline capable. It also is large enough to accommodate IETM point-to-point schematics viewing. The wireless detachable display is independent from the MMDS and can be used for a multitude of functions. For example, soldiers can conduct tailored DPMCS or access embedded logistics training programs both inside and outside the vehicle uninhibited by the fixed MMDS.

9-19. The portability of the system also provides field maintainers with the ability to query embedded diagnostics, receive technical support through the MRLN, or perform untethered equipment repairs according to procedures from IETMs hosted on the MMDS. The MMDS shall transmit maintenance fault data to tactical communications systems for generation of maintenance support requests without compromising either individual platform or unit security while the platform is concurrently transmitting and receiving tactical information.

HOMELAND SECURITY OPERATIONS

BACKGROUND

9-20. Today's terrorists can strike at any place, at any time, and with a wide variety of weapons. The terrorist threat to America takes many forms, has many places to hide, and is often invisible. Therefore, the need for homeland security is not tied to any specific threat. Instead, the need for homeland security is tied to the underlying vulnerability of American society and the fact that we can never be sure when or where the next attack on the homeland will occur.

DEFINITION OF HOMELAND SECURITY

9-21. Homeland security is made up of two components (homeland defense and civil support) (see Figure 9-9). Homeland Defense is the preparation for, prevention of, deterrence of, preemption of, defense against, and response to threats and aggressions directed towards the U.S. Refer to FM 3-07 for homeland security definitions.

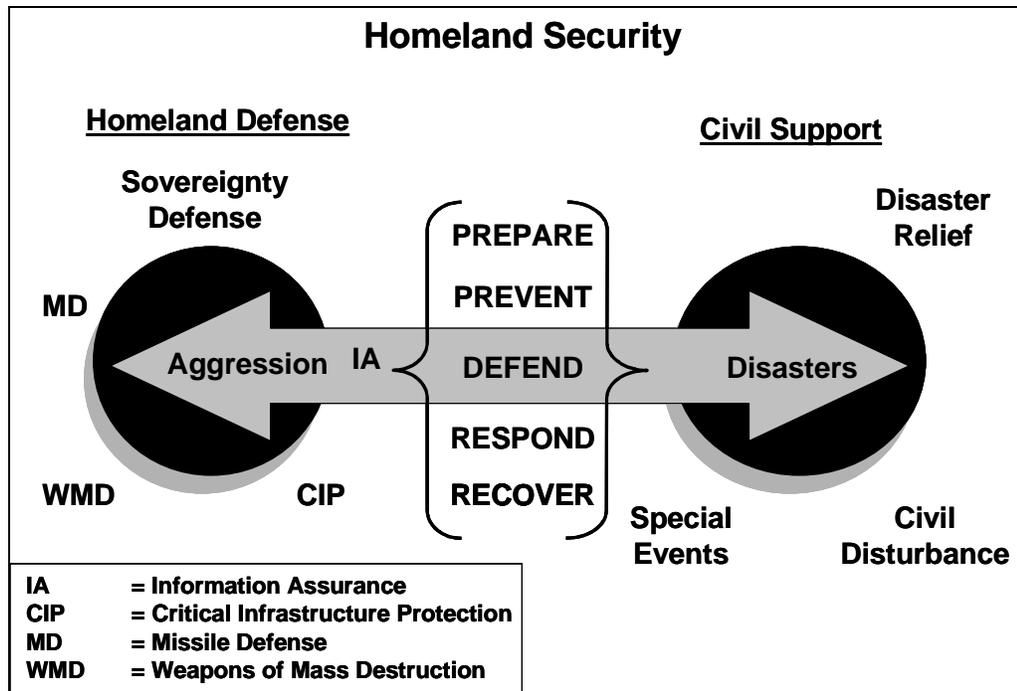


Figure 9-9. Homeland Security

Homeland Security Maintenance Operations

9-22. **Domestic Support Operations.** Domestic support operations within the CONUS may result in the U.S. being designated a theater of operations. Maintenance units may be ordered to deploy within the CONUS to support local and state authorities during a period of national crises. Once alerted, active duty maintenance units invoke deployment SOPs. For example, rear detachment organizations are established to ensure continuity of operations at home station. The sudden departure of maintenance units repair capability may impact on installation maintenance operations. Installation managers can provide augmentation through outside contract support or temporary hires at installation maintenance facilities. Should an active duty maintenance organization (engaged in maintenance support missions at home station) be activated, it becomes essential that continuity of maintenance operations at the unit or installation level be preserved.

9-23. Deploying with the CONUS provides for a number of advantages not available in non-developed countries. These advantages include:

- A fully developed theater of operations.
- Maximization of HN support from CONUS-based resources.
- Ensured communications for information management systems.
- Use of the Government credit card.
- Maximized interface with local, state (including National Guard), and federal agencies.
- Mature and shortened lines of communications.

9-24. Maintenance organizations deployed within the CONUS can be expected to perform either standard MOS skill tasks or basic soldier skills in the area of security operations. In either case, training will remain key to success. The U.S. Army Soldier and Biological Chemical Command (SBCCOM) assists units in developing weapons of mass destruction preparedness programs. Mobile teams can provide on-site delivery of assistance.

9-25. **Installation Security.** Another dimension to homeland security may be the defense and security of the home base or installation. Within this construct, the installation battlespace is analogous to the battlespace for combat operations defined in FM 3-0. Installation defense becomes the responsibility of the Installation Commander, which may at times include assigned active duty units to perform the security mission during heightened force protection condition (FPCON).

9-26. Rules for the use of force (RUF) are different from the more familiar rules of engagement (ROE). RUF are escalating rules for U.S.-based military personnel performing security duties when dealing with U.S. citizens. AR 190-14 prescribes rules for the use of force.

9-27. Should maintenance units be used as an Installation Guard Force, they may be “first responders” when an incident occurs. Installation “first responders” do the following:

- Respond to, contain, and identify the threat.
- Establish security.
- Maintain observation.
- Apprehend perpetrators.
- Safeguard property and personnel.
- Submit serious incident reports.

9-28. In all cases, security resources focus on protecting the military capability of the installation. Additional information about installation security can be obtained from the “Installation Commander’s Force Protection Handbook,” dated July 2002.

EMERGING MAINTENANCE ENABLERS

9-29. Critical for future maintenance operations will be the capture of “leap ahead” technology. This reduces the maintenance footprint while simultaneously enhancing maintenance support to the warfighter. The following key maintenance enablers of the GCSS-A ensure future maintenance operations meet the needs of the transforming Army:

- Rapid Manufacturing Technology (Mobile Parts Hospital).
- Common Engine Program.
- Multi-capable Maintainer Program.
- Application of Prognostics and Diagnostics.

GLOBAL COMBAT SUPPORT SYSTEM – ARMY

9-30. When fielded, the GCSS-Army will be the Army’s AIS to modernize and integrate the capabilities of existing logistics STAMIS. The GCSS-A provides a “one-stop” CSS information warehouse for maintenance support operations. Those capabilities to be integrated will include supply, property, ammunition, and maintenance functions (less medical) with significant enhancements. The principal logistics STAMIS to be functionally integrated include the ULLS, SARSS, SPBS-R, SAAS-MOD, and the SAMS.

9-31. The GCSS-A operates on a commercially-designed Enterprise Resource Planning (ERP) system. This system integrates information from multifunctional CSS data sources (supply, maintenance, ammunition, personnel, medical, and so on) and allows for data exchange, which establishes the logistics COP.

9-32. GCSS-Army ERP enables distribution managers to attain a maintenance COP of materiel in the pipeline, perform decision support analysis, and control their portion of the pipeline based on the three tenants of distribution; visibility, capacity, and control. An AMC led effort, ERP automates supply chain management and defines the process used to manage all maintenance resources and their use in the enterprise. Its objective is to integrate all organizations and CSS functions (including maintenance) into a single data warehouse.

9-33. The GCSS-Army and ERP will improve maintenance information management by eliminating duplicative information systems, improving the sharing of data, and leveraging advances in advanced information technology (see Figure 9-10). It will provide the ability to support joint operations with sister services, as well as provide support to our allies. The GCSS-Army's ERP enables maintenance information fusion, thereby providing CSS SU for decisions affecting performance of the maintenance system. The GCSS-Army will have a link into the GCSS-A through the CSSCS.

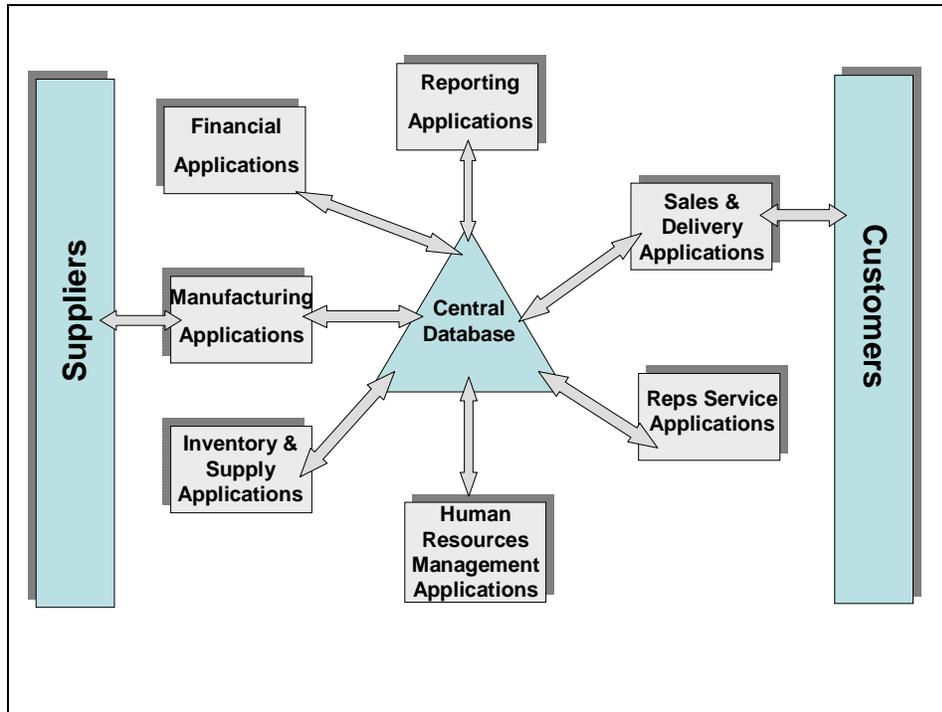


Figure 9-10. Typical ERP Package

Enterprise Resource Planning

9-34. ERP is a software application package of pre-engineered, ready-to-implement, integrated application modules that cater to the business functions of an enterprise. ERP provides an integrated system that meets the Army's Logistics Vision and provides a single version of the "truth" (horizontal and vertical) about the performance of the distribution system. ERP software possesses the flexibility for configuring and customizing dynamically the delivered functionality of the package to suit the specific requirements of the enterprise. ERP enables the enterprise to operate as an integrated, enterprise-wide, process-oriented, information-driven, and real-time network. The three key business objectives intrinsic to ERP are greater efficiencies (the heart of the enterprise), improved integration of functions across the enterprise, and extended integration of outside organizations; for example improved supply chain management. The Army has selected the ERP application of systems, applications, and products (SAP) in data processing to manage supply, maintenance, and other CSS functions as appropriate for the GCSS-Army enterprise. The SAP major elements are financial accounting, human resources, manufacturing and logistics, and

sales and distribution. Each module accesses over 1,000 business processes. SAP's strategy is to integrate all business operations in an overall system for planning, controlling, and monitoring the business activities of the enterprise. SAP consists of a presentation, application, and database component. The presentation server enables access to the enterprise, the application server includes the processing logic of the system, and the central server contains the database. The fundamental change associated with implementing ERP is that ERP operates on streamlined and proven best business practices using a single point of access via a web browser to applications, content, and services, with a personalized, role-based user interface that can be customized to meet individual needs.

RAPID MANUFACTURING TECHNOLOGY

9-35. Rapid Manufacturing Technology (RMT) delivers a field-tested mobile parts hospital (MPH) capable of making Army components in a timely manner, near the point of need (see Figure 9-11). It is designed for deployment to remote locations for emergency repair of non-operational equipment. The MPH can reverse engineer a component when technical data is not available by retrieving manufacturing data via satellite. If a data link is not available, the MPH can gather geometric data through the use of an onboard 3-D laser scanning system. The MPH focuses on decreasing long part procurement times to either a few hours, or at worst, a few days, to provide repair parts near the point of need in the battlespace.



Figure 9-11. Mobile Parts Hospital

- 9-36. The following are the advantages of the mobile parts hospital:
- Cuts supply and administrative lead times.
 - Reduces the logprint on the battlefield.
 - Boosts readiness.

COMMON ENGINE PROGRAM

9-37. The Common Engine Program reduces the logprint in the COMZ and reduces the logistics cost. A common engine among all aircraft reduces the number of spare engines and repair parts necessary to maintain the fleet, which reduces the logprint and lowers cost. A common engine also reduces the amount of ground support equipment required, which further

reduces the logprint. A common engine among ground (such as the Abrams/Crusader LV100 engine) provides the following advantages:

- Twenty-five percent improved range.
- Seventy-six percent decreased operating and support costs.
- Forty-three percent fewer parts.
- Decreased maintenance requirements.
- Minimum impact to training and tactics.

MULTI-CAPABLE MAINTAINER

9-38. The goal of the new two-level maintenance system is to provide support as close to the customer as possible. Supporting all customers within a given area will continue to be the cornerstone of maintenance doctrine through the early decades of the 21st century. Toward that end, the Ordnance Corps has fielded two multi-capable MOSs to support the Abrams and Bradley weapon platforms.

9-39. Work has also begun to field one additional multi-capable MOS (see Figure 9-12) to support the Paladin platform, as well as to consolidate common units and DS MOSs tailored to perform replacement maintenance. The new MOS consolidations include fielding a single wheel and track MOS and an electronic repair MOS that consolidates telephone, computer, and special devices repair. The new MOS will be fielded in FY 05, with additional electronic and ground support MOS consolidations following in the out years. The consolidation of future maintenance skill levels and MOSs will shorten repair time; reduce redundancy in repair parts, tools, and equipment; and provide the right Ordnance soldier at the right place on the battlefield. Figure 9-12 provides the blueprint for Ordnance Corps transition through Year 2010 to a fully implemented multi-capable maintainer capability.

EMBEDDED WEAPON SYSTEM PROGNOSTICS AND DIAGNOSTICS

9-40. **IETMs/Embedded Diagnostics and Prognostics.** These are computerized, screen-based, interactive diagnostic and maintenance tools used to troubleshoot, isolate faults, and identify the maintenance processes for Weapons systems and other equipment. IETMs diagnose by communicating and interacting with selected components of the Weapons system.

9-41. **Embedded Diagnostics.** The application of diagnostics equipment/software onboard a system to accomplish fault detection through direct linkage to a system's embedded sensors through an open architecture format. Actual fault conditions are identified and determined by the usage of diagnostic reasoning software and hardware down to the LRU level. This allows for both the static and mobile monitoring of vehicle "health" status.

9-42. Prognostics reflect the evolution of the improved diagnostics and the processing of system information obtained through the embedded diagnostics. It is the software application that allows us to anticipate pending failures and forecast remaining life expectancy of the faulty system and/or part. These predictions are based upon the assessment of equipment parameters and fault codes compared against the sensor data collected from the system (see Figure 9-13).

