COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS AND INTELLIGENCE (C⁴I) SYSTEMS

Critical U.S. Army C⁴I capabilities are provided through U.S. Army offices like the **Program Executive Office for Command Control Communications-Tactical**, **Program Executive Office for Intelligence, Electronic Warfare and Sensors**, and **Program Executive Office for Enterprise Information Systems**. In addition, current and next-generation warfighter support is also being delivered through the **Joint Program Executive Office for Joint Tactical Radio System**.

The U.S. Army **Program Executive Office for Command Control Communications-Tactical (PEO C³T)** designs, acquires, fields and supports fully integrated and cost-effective command, control, communications, computers, intelligence, surveillance and reconnaissance (C⁴ISR) solutions that meet warfighter capability needs while sustaining a world-class workforce. To connect soldiers on the battlefield, PEO C³T rapidly develops, fields and supports leading-edge, survivable, secure and interoperable tactical, theater, and strategic command-and-control and communications systems that result in providing the right system at the best value at the right time to the warfighter.

PEO C³T project management offices include: Battle Command; Force XXI Battle Command Brigade and Below; Mobile Electric Power; and Warfighter Information Network-Tactical. The PEO C³T organization also encompasses subordinate product directors and special project offices.

The following representative program sampling reflects how PEO C³T continues to improve and support current systems and develop future systems to support the developing Army vision of an information-enabled force.

Global Command and Control System-Army (GCCS-A) is the Army's strategic, theater and tactical command, control, communications (C³) system. It provides a seamless link of operational information and critical data from the strategic Global Command and Control System-Joint (GCCS-J) to Army theater elements and below. GCCS-A assists in mission planning, deployment support, operations in theater and redeployment. It provides a common picture of Army tactical operations to the joint and coalition communities and delivers joint asset visibility to the Army to facilitate operations. GCCS-A is the commander's battle command asset for force planning and projection, readiness and situational awareness, and is the system of record for theater Army headquarters worldwide.

Net-Enabled Command Capability (NECC) is the DoD principal joint command-and-control (C²) capability that will be accessible in a netcentric environment and is focused on providing the commander and the warfighter with the data and information support infrastructure required to make timely, effective and informed decisions.

Strategic Battle Command (SBC) is the Army battle command systems (ABCS) component providing Army, joint and coalition commanders with critical planning and situational awareness capabilities. Readiness reporting, force projection and situational awareness capabilities are provided through the GCCS-A and the Defense Readiness Reporting System-Army (DRRS-A). SBC serves as the Army's component program office for Net-Enabled Capability (NECC). SBC capabilities enable the Army to bring the right forces to the right fight at the right time.

Tactical Battle Command (TBC) provides a mission-critical suite of command-and-control products deployed in today's fight, while evolving to meet the needs of tomorrow's mission. TBC is a critical element of Army battle command systems, which combine multiple, complex capabilities into an integrated tool set, allowing warfighters to visualize the battlespace and synchronize the elements of combat power while simultaneously collaborating and sharing data in near-real time. TBC includes: Maneuver Control System (MCS); Command Post of the Future (CPOF); Battle Command Common Services (BCCS); Chemical, Biological, Radiological and

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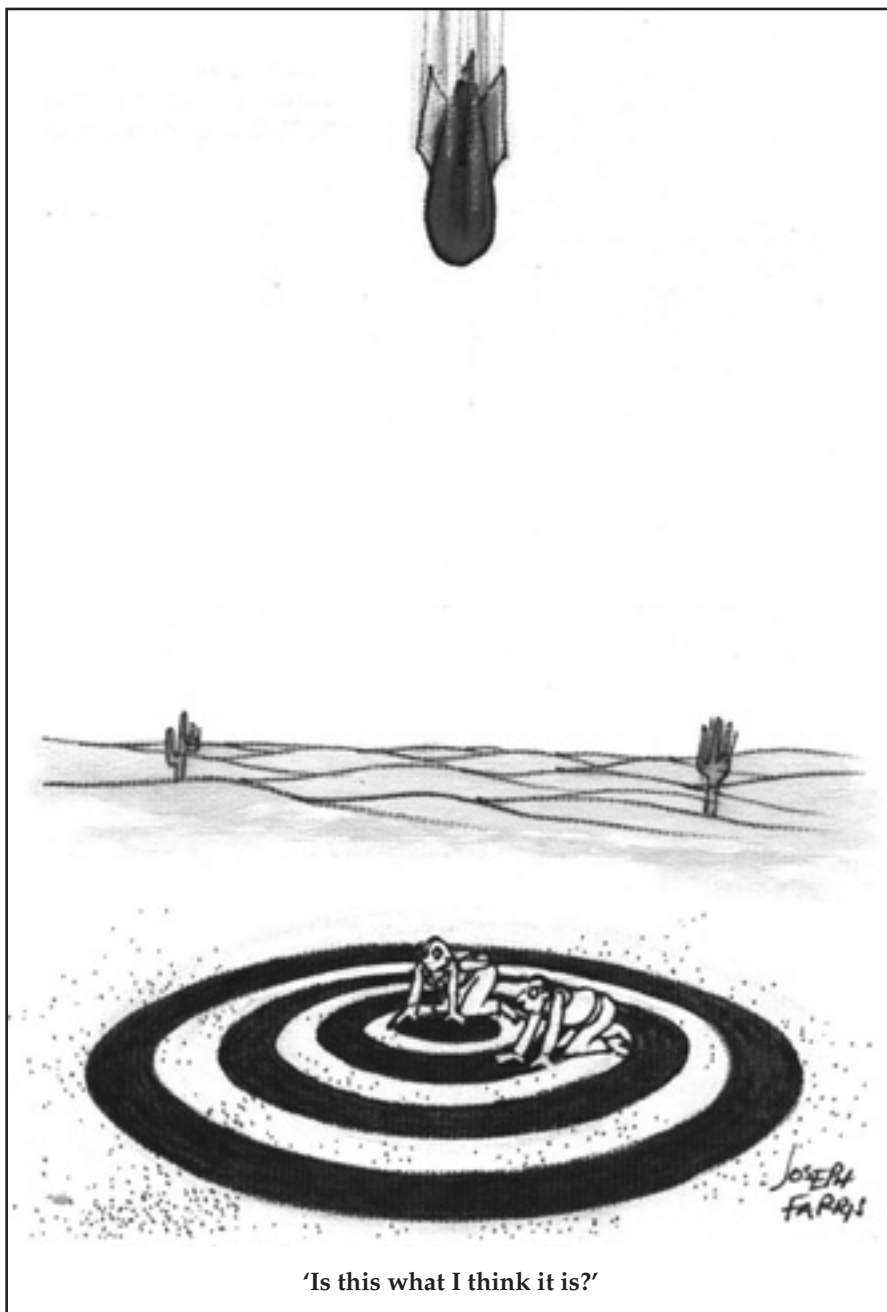
Nuclear (CBRN); and a joint convergence effort with the Marine Corps.

Tactical Battle Command-Command Post of the Future (TBC-CPOF) serves as the Army's mission-critical C^2 system that provides collaborative and situational awareness tools to support decision making, planning, rehearsal and execution management. This capability is the primary tool used throughout the Army to manage operations, brief commanders and provide the fused common operational picture. TBC is a critical element of the Army's battle command systems, which combine multiple complex capabilities into an integrated tool set deployed in the Iraq and Afghanistan theaters, as well as in Kosovo. The TBC capabilities provide the primary C^2 information and common operational picture as well as SharePoint, business intelligence, and joint and coalition interoperability. CPOF serves as the Army's mission-critical C^2 system that provides collaborative and situational awareness tools to support decision making, planning, rehearsal and execution management.

Tactical Battle Command-Battle Command Common Services (TBC-BCCS) Tactical Battle Command (TBC)/Maneuver Control System (MCS) provides the tactical core environment and common services baseline for collaborative command-and-control executive decision-making capabilities, maneuver functional and battle staff tools, and enterprise services. TBC/MCS is a suite of products and services that include the Command Post of the Future (CPOF), Battle Command Common Services (BCCS), Maneuver Control System (MCS), joint convergence effort with the Marine Corps, tactical SharePoint web portal, coalition interoperability and integration of other Army battle command systems. BCCS provides the enabling infrastructure for ABCS and tactical battle command and for migration to a netcentric enterprise services (NCES) environment and also net-enabled command capability (NECC). The battle command server provides interoperability services including the publish and subscribe service (PASS) and data dissemination service (DDS). The server also supports joint convergence with the Marine Corps by providing a data exchange gateway that allows the direct exchange of common operating picture data between the joint services. SharePoint portal services are also provided for asynchronous collaboration, managing business and operational processes and leveraging business intelligence tools for data analysis.

Joint Capabilities Release (JCR)/Joint Battle Command-Platform (JBC-P) FBCB^2 provides a singular command-and-control information solution to soldiers at the brigade-and-below level across the entire force. JCR will be the next step in this holistic approach toward battle command modernization. The JBC-P will provide improvements in information sharing among services and coalition partners. The result will be increased effectiveness in conducting joint, interagency and multinational operations.

Common Hardware Systems (CHS) provide the warfighter with a suite of common, standardized, state-of-the-art, ruggedized automation and network devices that meet tactical requirements of multiple C^{4}ISR, ABCS and other weapon systems. The CHS program benefits the warfighter by enabling commanders, staff and soldiers to incorporate emerging technologies into command and control and other systems. CHS consolidates procurement quantities from individual users, DoD components and federal agencies to leverage economy-of-scale efficiencies to achieve cost benefits that are not available to individual acquisition programs. In addition, CHS manages worldwide repair, maintenance and logistics support through contractor-operated CHS repair centers and management of a comprehensive warranty program.

Joint Network Management Systems (JNMS) is a combatant command, commander joint task force, joint communications planning and management tool. JNMS is an

automated software system. It will promote force-level situational awareness; provide enhanced flexibility to support the commander's intent; improve management of scarce spectrum resources; and provide increased security of critical systems and networks. JNMS provides commanders of combatant command and joint task forces with an automated capability to plan/manage joint C^4 networks. This includes the means for timely decisions and synchronization of communication assets; improves situational awareness, providing a common network view; better utilizes scarce resources to optimize network capacity; and provides transportable/deployable versions on laptops. Modularity provides specific planning for site-specific requirements (including server-based configurations).

Battle Command Sustainment Support System (BCS³) is a logistics command-and-control system that provides a logistics decision-making capability that supports U.S. land forces at war and in a garrison. It provides a Microsoft Windows-like common operational picture for logistics that is modular, tailorable and scalable in near-real time to meet the full spectrum of battlefield log C^2 requirements. The system supports training, mission planning, rehearsal and execution all in one tool, and operates in both an unclassified and classified environment. Operationally, it interfaces with other Army and joint, interagency and multinational C^2 and logistics business systems.

Data Readiness Reporting System-Army (DRRS-A) is a computerized, secure Web-enabled capability that provides commanders with an accurate representation of unit readiness to make critical C^2 decisions. DRRS-A reports mission-critical information including personnel levels, training status, equipment availability and equipment serviceability, and is a key enabler of the GCCS-A force readiness application. DRRS-A fuses Army training, readiness and equipment data to track detailed information on unit capabilities under high operational tempo conditions that are inherent in wartime.

Advanced Field Artillery Tactical Data System (AFATDS) is a multiservice (U.S. Army, Marine Corps and Navy), joint and combined forces fire-support command, control and communications (C^3) system. AFATDS provides the commander with tools including situational awareness, battle management, target analysis and target engagement. AFATDS provides a fully automated fire-support system, which minimizes the sensor-to-shooter time line and increases the hit ratio, as well as fully automated support for planning, coordinating and controlling mortars, field artillery cannons, rockets, guided missiles, close air support, attack helicopter and naval gunfire, close support, counterfire, interdiction

Gun display unit-replacement (GDU-R)

suppression of enemy air defenses (SEAD) and deep operations. The single version AFATDS software is used at all echelons from the platoon through echelons above corps and on U.S. Navy ships.

The **Centaur** system is a handheld technical fire direction system for multiservice, joint and combined forces, providing technical solution information to the fire direction centers in cannon field artillery units for field artillery fire missions. The Centaur is considered to be the primary backup system to AFATDS for technical fire direction solutions.

The **Gun Display Unit-Replacement (GDU-R)** system is a rugged personal digital assistant (section chief assembly) and two remote gunner displays, which provides the critical data link between a gun and the fire detecting center (FDC). The GDU-R allows firing sections to receive and display firing data and firing commands transmitted by AFATDS at the FDC, and transmits the status of the gun to the AFATDS as the mission progresses.

Lightweight forward entry device (LFED)

The GDU-R is designed to support both self-propelled and towed cannon weapon systems. GDU-R is a critical element of battle command applications.

Joint Automated Deep Operations Coordination System (JADOCS) is a joint and combined warfighting application. JADOCS has engaged in a "spiral process" developed during two advanced concept technology demonstrations (ACTDs) to provide "precision strike" and C^2 capabilities. JADOCS provides warfighters with a combination of tools, services and mission managers to bridge "capability gaps" identified by combatant commanders (COCOMs) and service components. JADOCS provides capabilities for rapid system-of-systems integration, visualization, coordination and deconfliction of critical mission information.

Lightweight Forward Entry Device (LFED). Fire support is the effects of lethal and nonlethal weapons (fires) that directly support land, maritime, amphibious and special operation forces to engage enemy forces, combat formations, and facilities in pursuit of tactical and operational objectives. Fire-support coordination is the planning and execution of fires so that a suitable weapon or group of weapons adequately covers targets. Forward entry devices are handheld devices used by forward observers and fire-support teams to transmit and receive fire-support messages over standard military radios. LFED provides a digitized connection between the forward observers and the advanced field artillery tactical data systems, and provides a vital sensor-to-shooter link. LFED replaces the much heavier FED, which was fielded during the early 1990s. As technology progressed, the FED became obsolete and was unable to run current fire-support software packages. The LFED hosts the forward observer system (FOS) software, which enables fire-support officers to plan, control and execute fire-support operations at maneuver platoon, company, battalion and brigade levels. Commencing in fiscal year (FY) 2003, combat observation lasing teams were fielded the stand-alone computer unit (SCU) to replace the lightweight computer unit (LCU).

The **Pocket-Sized Forward Entry Device (PFED)** is a handheld forward entry device used by forward observers and fire-support teams to transmit and receive fire-support messages over standard military line-of-sight, HF and SATCOM radios. PFED is

Windows CE/Windows Mobile-based; utilizes existing single-channel ground and airborne radio system (SINCGARS) advanced system improvement program (ASIP) communications to provide the lightest, most powerful dismounted system for developing "calls for fire" and is fully interoperable with both AFATDS and current fire-support systems. When coupled with the existing and future laser ranging binoculars, global positioning system devices and tactical communications equipment, the PFED system enables rapid precision sensor-to-shooter and surveillance capabilities. PFED integrates these systems, thus improving their function as a whole and increasing their performance as a system of systems. PFED provides a digital connection between the forward observers, the lightweight forward entry device and AFATDS, thus providing a vital sensor-to-shooter link.

Indirect Fires Protection Capability (IFPC). As the counter-rocket, artillery and mortar (C-RAM) makes the transition to a program of record (PoR), it will be renamed indirect fires protection capability (IFPC) Increment I and become a formal PoR prior to entering the acquisition life cycle in the production and deployment phase. It will provide a "warn" capability to brigade combat teams (BCTs) for detection of threat rocket, artillery and mortar rounds; transmission of the detection data to a C^2 element for correlation and determination of the point of interest (POI); and passage of the POI information to audio and visual alarms for localized or full-area warning over the defended area. Because the warn capability cannot exist without the sense and C^2 elements, IFPC Increment I will integrate the following systems: Sense—various combinations of the AN/TPQ-36 series firefinder radar, enhanced AN/TPQ-36 firefinder radar, AN/TPQ-37 series firefinder radar, and/or AN/TPQ-48 series lightweight counter-mortar radar (LCMR); C^2—C-RAM C^2, within the air defense airspace management (ADAM) cell; communications—wireless LAN; and warn—WAVES. Of the equipment required for the IFPC Increment I capability, the AN/TPQ-36 series firefinder radar, enhanced AN/TPQ-36 firefinder radar, AN/TPQ-37 series firefinder radar, AN/TPQ-48 series LCMR, and the C-RAM C^2 within the ADAM cell are existing capabilities that have already been fielded to, and are included in, the table of organization and equipment (TOE) for BCTs. New equipment to be fielded to the BCTs for Increment I is limited to a commercial off-the-shelf (COTS) wireless LAN and WAVES, along with current C-RAM software. Future increments will build on Increment I by acquiring enhanced sense, C^2, intercept, warn,

shape and respond capabilities. Increment 2 will primarily provide a new intercept capability. The objective capability will be a component of the modular Army and joint forces and will provide an advanced, networked IFPC and force protection SoS, capable of both protecting and maneuvering with the BCT.

The **Air and Missile Defense Planning and Control System (AMDPCS)** provides command-and-control capability for air defense artillery (ADA) brigades, Army air and missile defense commands (AAMDCs), maneuver brigade combat team and joint force command-and-control elements, such as the battlefield coordination detachments (BCDs). Shelter Systems-AMDPCS provides various air defense shelter systems for all echelons based on a baseline known as the air defense and airspace management shelter.

The **Air and Missile Defense Workstation (AMDWS)** is a common defense/staff planning and situational awareness/situational understanding software tool. AMDWS is deployed with air and missile defense units at all echelons and is also a component of the ADAM. The AMDWS performs all aspects of AMD force operations. It assists in the automated development of the intelligence preparation of the battlefield, provides situational awareness,

Standardized integrated command post system (SICPS)

and is capable of planning, coordinating, and synchronizing the air, land and sea battle. AMDWS is the interoperability link for AMD forces with the ABCS and provides the air situational input to the common operational picture.

Forward Area Air Defense Command and Control (FAAD C^2). The FAAD C^2 system consists of common hardware, software and communications equipment to meet the command-and-control and targeting needs of C-RAM units and AMD battalions. FAAD supports the air and missile defense battalion mission by providing C^2I information to higher, adjacent and lower units. Computer displays allow commanders access to databases for the air picture, situation reports, enemy assess-

ments and friendly forces. The FAAD C^2 system can process information classified up to secret. The system provides an embedded training capability that will replicate those situations encountered in actual mission operation. Evolving software capabilities are added with each new version throughout the FAAD C^2 development cycle. The FAAD C^2 system also has the capability to interface with joint and NATO C^2 systems. To accomplish its mission, FAAD C^2 is integrated into and interoperates with both the ABCS and AMDWS. The AMDWS is integrated in FAAD C^2-equipped battalions at the ADA battery and battalion command posts, and is a product under the AMDPCS program. The FAAD C^2 engagement operations subsystem provides the joint air picture via implementation of two-way TADIL-A, -B and -J links. The FAAD C^2 system is the backbone for the C-RAM system and assists with digitization of the battlefield by providing air situational awareness to the supported force, alerting and cueing to C-RAM systems and FAAD weapons. The FAAD C^2 system supports C-RAM by receiving and correlating sensor inputs, then alerting the intercept system and the sense and warn elements of a mortar, artillery and/or rocket attack. The FAAD C^2's ever-expanding mission encompasses the detection, acquisition, and identification of enemy mortar and rocket projectiles, helicopters, fixed-winged aircraft, and unmanned aerial vehicles; the distribution and dissemination of C^2I data among the air and missile defense units and combined arms elements; the provision of early warning; and alerting the supported forces.

Standardized Integrated Command Post System (SICPS)-based command posts are where commanders and staffs collaborate, plan and execute netcentric battle command, maintain real-time situational awareness of the common operational picture (COP) and make decisions based on objective information. In addition, CPS&I uses the SICPS program as the focal point for the system-of-systems integration, fielding and training of a holistic battle command capability through the unit set fielding (USF) process. This process takes the various Army battle command systems, the network and other enablers in the command post and moves units through a complete system-of-systems integration and a training exercise to produce a holistic, functional digital command post. This integration and training effort has proven absolutely critical to the effective function of the commander and staff. SICPS standardizes network equipment, architecture, data products, training and integration of ABCS and, thus, is a

combat enabler. In addition, this command post standardization achieves significant cost savings by precluding unit commanders from buying non-SICPS equipment and suffering the added costs associated with a nonstandard network integration, data product development and logistics support.

The **Integrated System Controller (ISYS-CON) V(4)** is the lower of a two-tier network management system to be deployed Army-wide. The tactical Internet (TI) network is composed of tactical operations centers (TOC), upper tactical Internet (UTI) and lower tactical Internet (LTI) communica-

tions networks. The TI is managed using a combination of managers. ISYSCON (V)4 provides a semiautonomous management capability to aid in the planning, initialization, monitoring, troubleshooting and reconfiguration of the LTI. This highly automated management capability will significantly reduce the time and effort required to plan, configure, initialize, monitor and reconfigure the TOC communications networks and the LTI. TOCs communicate via TOC-to-TOC networks, which employ UTI resources such as PM WIN-T Inc 1 or Joint Network Node (JNN), near-term data radios (NTDR), or portable communications

devices. To support TOC connectivity with the LTI, ISYSCON (V)4 is designed to be deployed in division, brigade and battalion TOCs. The ISYSCON (V)4 software runs on Panasonic Toughbook computers and comes in two configurations, AN/GYK-50B and AN/GYK-64. The difference between the two configurations is that the 50B version consists of one Panasonic laptop and the 64 consists of two Panasonic laptops.

The **Warfighter Information Network-Tactical Increment 1 (WIN-T Inc 1)** Joint Network Node (JNN) is defined as providing "network at-the-quick-halt" and is further divided into two sub-increments defined as WIN-T Increment 1a, "extended networking at-the-halt," and WIN-T 1b, "enhanced networking at-the-halt." WIN-T Increment 1 is a joint compatible communications package that allows the warfighter to use advanced networking capabilities, retain interoperability with current force systems, and keep in step with future increments of WIN-T. It's a rapidly deployable, early-entry system housed in an S250 shelter and mounted on an ECV Humvee for roll-on/roll-off mobility. WIN-T Increment

1a upgrades the former JNN satellite capability to access the Ka-band defense wideband global satellite (WGS), reducing reliance on commercial Ku-band satellites. WIN-T Increment 1b introduces the net-centric waveform, a dynamic waveform that optimizes bandwidth and satellite utilization. It also introduces a colorless core security architecture, which meets global information grid information assurance (IA) security compliance requirements.

The **Warfighter Information Network-Tactical Increment 2 (WIN-T Inc 2)** adds warfighter mobility and provides a communication network down to the company level. Tactical communication nodes in Increment 2 are the first step to providing mobile infrastructure on the battlefield. Combined with mobile points of presence, vehicle wireless packages and soldier network extensions, Increment 2 enables mobile battle command from division to company in a completely ad hoc, self-forming network. The WIN-T Increment 2 addition of embedding communications gear in the commanders' vehicles enables secure Internet protocol router (SIPR) into the warfighting platform. Commanders and select staff have the ability to maneuver anywhere on the battlefield and maintain connectivity to the network.

The **Warfighter Information Network-Tactical Increment 3 (WIN-T Inc 3)** provides full network mobility and introduces the air tier, providing a three-tiered architecture: traditional line-of-sight, airborne through the use of unmanned aerial vehicles (UAVs), other airborne platforms and satellites. Increment 3 introduces embedded JC4ISR radios into the FCS platforms. It addresses the size, weight, power and cooling requirements for systems to be hosted in future vehicles. Increment 3 Net-Ops delivers full network management, information dissemination management, and information assurance planning, monitoring, administration and response (PAMR) as well as spectrum planning and management for all battlefield emitters.

The **Phoenix Super High Frequency (SHF) Terminal** provides multiband capability in the SHF range and will operate over commercial and military SHF satellites. The terminal provides high capacity inter- and intra-theater data range extension support for expeditionary signal battalions (ESBs). The terminal is the war-fighter's primary means of reachback communications. The SHF terminal operates in the commercial C and Ku bands, and the military X and Ka bands, and will support WGS interoperability. The Phoenix SHF terminal consists of an integrated assemblage of nondevelopmental items (NDIs), commercial off-the-

shelf (COTS) equipment and government furnished equipment (GFE), and embodies the force projection attributes and high-throughput capacity consistent with the Army's migration to the objective force. It can interface with other strategic networks via standardized tactical entry points (STEP) or strategic assets.

The **Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T)** provides tactical users with secure, survivable, anti-jam satellite communications in a Humvee configuration. This equipment communicates at extremely high frequency (EHF) and processes data and voice communications at both low and medium EHF data rates. SMART-T provides range extension to the Army's current and future tactical communications networks. SMART-T is being modified to communicate over the advanced EHF (AEHF) satellite to provide a significant increase in data rates.

The **Secure Enroute Communications Package-Improved (SECOMP-I)** system is a standardized, secure, interoperable, and integrated command, control, communications, computers and intelligence (C4I) information system to support force projection operations. The SECOMP-I system provides VHF/UHF line-of-sight (LOS) and UHF single-channel tactical satellite (SCTACSAT) beyond line-of-sight (BLOS) data and voice capabilities to the mission commander and staff, while deploying to an area of operations (AO) aboard USAF C-130 and C-17 aircraft. SECOMP-I also provides initial ground communications when landing in an AO. SECOMP-I is the program of record for the Department of
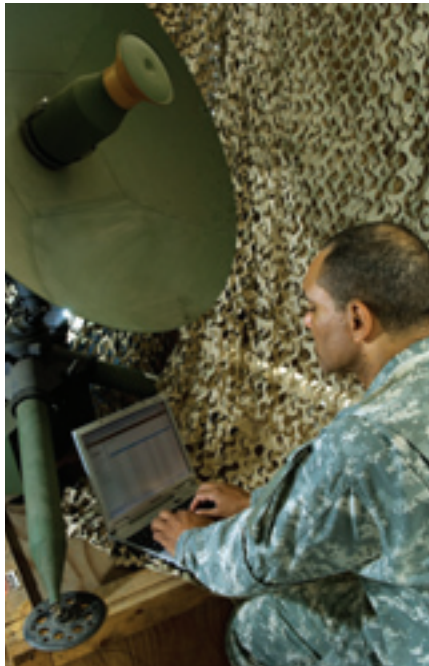
the Army that provides Army, combatant command and joint staff users en route mission, planning and rehearsal (EMPR) capabilities to support forced and early entry forces, Army transformation and digitization efforts. SECOMP-I provides a capability for Army commanders to exercise mission planning and rehearsal; receive and disseminate updated intelligence; conduct command and control of forces deploying aboard U.S. Air Force aircraft; and provide initial ground communications in the area of operations.

The **Global Broadcasting Service (GBS)** provides joint tactical operations with high-speed, multimedia communications and information for deployed or garrisoned forces. GBS takes advantage of new technology and information transfer systems to support modern warfare. GBS provides high-speed, one-way flow of multimegabyte video and data products including NTSC video, large data files, map files, web products and so on. GBS operates as a system of broadcast satellites under the UHF follow-on (UFO) Ka-band satellite program, augmented as required by commercial Ku-band satellites. The Army supports the GBS JPO in development of the transportable ground receiver suites (TGRS). The Army is the technical lead for the theater injection point (TIP) consisting of the theater satellite broadcast manager (TSBM) and an RF component, which will transmit vital combatant command/joint force command in-theater information directly to the warfighter.

The **Enhanced Position Location Reporting System (EPLRS)** provides a mobile

wireless data communications backbone for the Army's tactical Internet, provides embedded situational awareness/position navigation and is a common system for Army, Air Force, Navy and Marine Corps warfighters. EPLRS is a key enabler for network-centric warfare. EPLRS supports the Modular Army and is interoperable with EPLRS in the Air Force, Marine Corps and Navy. EPLRS mobile networks are used by Army battle command system and Force XXI Battle Command Brigade and Below host computers for situational awareness and command and control. EPLRS currently consists of an EPLRS network manager (ENM) and radios that can be configured for manpackable, vehicular and airborne use. EPLRS uses a time-division, multiple-access communications architecture to avoid transmission contention along with frequency hopping, error detection and correction with interleaving. It also uses spread spectrum technology to provide jamming resistance. Improvements to EPLRS include automated net planning with ENM and field-programmable software upgrades that provide improved message reliability, increased capacity and more efficient use of available bandwidth.

The **Single-Channel Ground and Airborne Radio System (SINCGARS),** with the Internet controller, provides the communications link for the digitized force. SINCGARS configurations include manpackable, vehicular (both low and high power) and airborne models. Communications security (COMSEC) is integrated in currently produced versions of the ground and airborne radios. The system improvement program (SIP) models provide upgrades to enhance operational capability in the tactical Internet (TI) environment. The advanced system improvement program (ASIP) models—of a reduced size and weight—provide further enhancements to operational capability in the TI environment.

The **Combat Survivor Evader Locator (CSEL)** system is a handheld survivor radio that provides downed aircrew members and special operations forces personnel multiple communications capabilities and precision location. The radio determines the survivor's location through an embedded global positioning system (GPS) capability. The survivor transmits position/location and situational information via two-way voice line-of-sight, beacon or over-the-horizon (OTH) communication paths. The Joint Search and Rescue Center (JSRC) receives the OTH information and conducts a handoff to operational forces that carry out the combat search and rescue (CSAR) mission. The two-way voice communication ensures single-pass pickup by enabling the survivor to communicate with the inbound CSAR aircraft. The Army survival radio requirements are Army aviation and Special Forces.

The **Mobile Electric Power** Project Man-

Global broadcasting service (GBS)

agement Office (PM MEP) provides modern, tactical, standardized mobile electric-power generating sources for all the armed services in DoD and environmental control units (ECU) for the Department of the Army. The products to support this important mission not only power, cool and dehumidify nearly every system on the battlefield, they are critical to the information technology modernization efforts of all the services. Hospitals, air bases, port facilities, air defense operations, field services, C⁴I, and myriad weapon systems critical to warfighters and commanders all depend on available, reliable electric power and environmental control. PM MEP programs and products include: small generator sets (2 kilowatt to 3 kilowatt); hybrid intelligent power management (HI-POWER); medium generator sets (5 kilowatt to 60 kilowatt); large generator sets (100 kilowatt and 200 kilowatt); prime power systems; deployable power generation and distribution system (DPGDS) (840kW); power units and power plants (PU/PP); power distribution illumination system, electrical (PDISE); environmental control units and improved environmental control units (IECU).

PEO Intelligence, Electronic Warfare and Sensors

The mission of the **Program Executive Office for Intelligence, Electronic Warfare and Sensors (PEO IEW&S)** is to develop, acquire, field and provide for life-cycle support of intelligence, electronic warfare, and target acquisition capabilities integrated in the layers of the network, operationally relevant to understanding the battlefield and enabling persistent surveillance.

Subordinate program areas include the aerial common sensor, distributed common ground system-Army, navigation systems, night vision/reconnaissance, surveillance and target acquisition, aircraft survivability equipment, space program office/tactical exploitation of national capabilities and signals warfare.

The following representative program sampling reflects just some of the ways that these offices are working to deliver and refine capabilities essential to setting the conditions for the joint warfighter to control time, space and the environment, while greatly enhancing survivability and lethality.

The **Aerial Common Sensor (ACS)** provides actionable intelligence directly to ground commanders with the timeliness and accuracy they require. ACS is a multi-intelligence, manned, fixed-wing, reconnaissance, surveillance and target acquisition (RSTA)/intelligence, surveillance and reconnaissance (ISR) system that carries multiple, highly accurate intelligence sensors, processing tools, air/ground/satellite communications and onboard operators/analysts. Capable of worldwide deployment, ACS provides dedicated, persistent RSTA/ISR coverage over the depth and breadth of a tactical commander's battlespace. ACS is integrated in the greater distributed common ground system-Army (DCGS-A). This unique combination of attributes (multiintelligence sensing, persistence, wide-area coverage, reach, manned/unmanned teaming, DCGS-A connectivity and battle command) provides the ground tactical commander a near-real-time operational view of unprecedented clarity, enabling tactical ground forces to operate at their highest potential in future joint operations. ACS will replace the airborne reconnaissance low (ARL) and guardrail common sensor (GR/CS) airborne surveillance systems and will be fielded to the Army's aerial exploitation battalions (AEB).
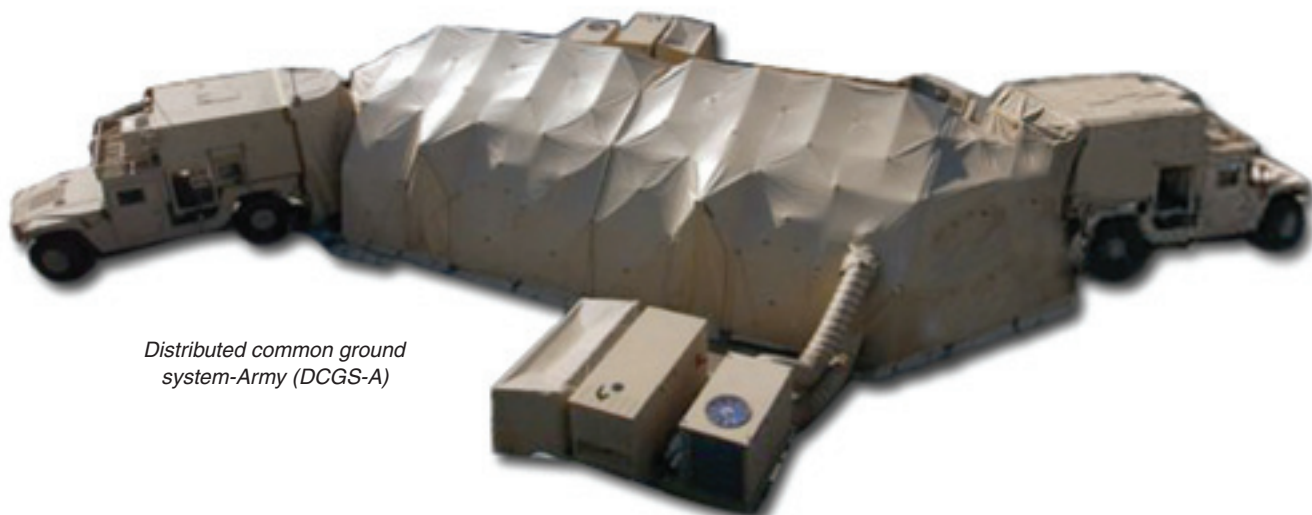
The **Distributed Common Ground System-Army (DCGS-A)** provides an integrated intelligence, surveillance and reconnaissance ground processing system, operating in a secure distributed and collaborative environment, enabled by networks. DCGS-A will serve as the primary ground system-of-systems for airborne and ground sensor platforms. DCGS-A enables the commander to achieve situational understanding by leveraging multiple sources of data, information and intelligence, and to synchronize the elements of joint and combined arms combat power to "see first, understand first, act first and finish decisively." DCGS-A consolidates/replaces nine systems. The core functions of DCGS-A are receipt and processing of select ISR sensor data, control of select Army sensor systems, intelligence synchronization, ISR planning, reconnaissance and surveillance integration, fusion of sensor information, and direction and distribution of relevant threat, nonaligned, friendly and environmental (weather and geospatial) information. DCGS-A emphasizes the use of reach- and split-based operations to improve data access, reduce forward footprint, and increase interoperability via a network-enabled modular, tailorable system in fixed, mobile and embedded configurations.

DCGS-A will support three primary roles. As an analyst tool set, DCGS-A enables the user to collaborate, synchronize, and integrate organic and nonorganic direct and general-support collection elements with operations. As the ISR component of the Army battle command, DCGS-A can discover and use all relevant threat, noncombatant, weather and geospatial data, and evaluate technical data and information on behalf of a commander. DCGS-A provides organizational elements the ability to control select sensor platforms/payloads and process the collected data.

The **Global Positioning System (GPS)** is a space-based joint-service navigation program, led by the Air Force, which distributes position, velocity and timing (PVT) data. The GPS has three segments: a space segment (nominally 24 satellites), a ground control segment and a user equipment segment. User equipment consists of receivers configured for handheld, ground, aircraft and watercraft applications. Military GPS receivers use the precise positioning service (PPS) signal to gain enhanced accuracy and signal protection not available to commercial equipment. GPS receivers in the Army today are the precision lightweight GPS receiver (PLGR)—with more than 100,000 in handheld, installed and integrated applications—and the defense advanced GPS receiver (DAGR)—with more than 92,200 as handheld receivers and 62,000 distributed for platform installations to date for a total of 154,200 DAGRs fielded. In addition, GPS user equipment includes a ground-based GPS receiver applications module (GB–GRAM). More than 78,000 GB–GRAMs have been procured and provide an embedded PPS capability to a variety of weapon systems. The Army represents more than 80 percent of the requirement for user equipment.

Prophet is a ground-based tactical signals intelligence/electronic warfare sensor that creates a near-real-time electronic picture of the brigade combat team, Stryker BCT, armored cavalry regiment and battlefield surveillance brigade battlespace. Prophet provides intelligence support by reporting the location, tracking and identity of threat emitters. A secondary mission is electronic attack (EA) against enemy emitters.

Distributed common ground system-Army (DCGS-A)

The Prophet Spiral I Electronic Support (ES) system is being fielded to active and Reserve units in support of Operation Enduring Freedom and Operation Iraqi Freedom. The Prophet Spiral 1 ES system provides an increase in capability over the existing Prophet Block I system. Prophet consists of ground collection sensors capable of early entry and airborne insertion. The base dismounted Prophet capability provides force protection information from a manpackable system. Mounted Prophet sensors have an on-the-move collection and reporting capability; they enable Prophet to keep pace with supported units and reposition collection capability easily on the battlefield. Prophet will cross-cue other battlefield sensors and provide additional information that may confirm intelligence from other manned/unmanned battlefield sensors. Prophet ES is packaged in a Humvee trailer and towed behind the ES systems, providing both stationary and on-the-move capabilities.

The Prophet Enhanced System will provide an increase in capability over the existing Prophet Spiral 1 ES sensor. The Prophet Enhanced production contract was awarded on February 25, 2009. Prophet employs an open systems architecture, modular design and nonproprietary industry standards, supporting evolutionary growth and expansion via circuit card assemblies and software upgrades. This capability will be used to maintain relevancy on the battlefield and keep pace with technology advancements via a product improvement program to insert planned improvements and new unplanned capabilities into the Spiral 1 ES Sensor and Prophet Enhanced System.

The **AN/TMQ-52 Meteorological Measuring Set-Profiler (MMS-P)** uses a suite of meteorological sensors, meteorological data from communications satellites and an advanced weather model to provide highly accurate meteorological data for indirect-fire field artillery systems. The system uses common hardware, software and operating systems and is housed in a command post platform shelter and transported on an M1152A Humvee. Profiler measures and transmits meteorological conditions to indirect-fire direction centers, such as wind speed, wind direction, temperature, pressure and humidity, rate of precipitation, visibility, cloud height and cloud ceiling, all of which are necessary for precise targeting and terminal guidance of various munitions. Profiler uses this information to create a four-dimensional meteorological model (height, width, depth and time) that includes terrain effects. This new capability increases the lethality of all field artillery platforms such as the multiple launch rocket system (MLRS), Paladin, and self-propelled or towed howitzers by increasing the probability of a first-round hit, resulting in significant ammunition cost savings for the Army. The current Profiler provides meteorological coverage throughout a 60-kilometer radius, while the follow-on Block II variant extends coverage to 500 kilometers. For the first time, Army field artillery systems can apply meteorological data along the trajectory from the firing platform to the target area.

PEO Enterprise Information Systems

The **Program Executive Office for Enterprise Information Systems (PEO EIS)** supports C[4]I capabilities by providing infrastructure and information management systems to the Army, enabling it to achieve victory through total information dominance. PEO EIS develops, acquires and deploys tactical and management information technology systems and products. Representative programs include the following.

Acquisition Business Systems (Acq-Business) provide information management capabilities that support acquisition community needs for acquisition data, data management services and enterprise

Prophet enhanced system

business applications. These capabilities enable the consistent, effective and efficient conduct of the acquisition business. Planning and development of additional capabilities are ongoing with rapid prototyping, user involvement and rapid capability distribution as core elements of the program strategy. The acquisition business program consists of a continuing series of independent software projects managed to cost, schedule and user requirements. This program strategy is modeled after best industry practices for rapid development and distribution of enterprise software solutions. The initial service-oriented environment has been deployed and provides an initial set of capabilities.

The **Army Enterprise Systems Integration Program (AESIP)** is the means by which the Army will integrate business functions by providing a single source for enterprise hub services, centralized master data management and business intelligence and analytics. The mission of AESIP (formerly known as Product Lifecycle Management Plus) has been expanded to provide cross-domain integration services for the Army's business mission area. The AESIP has delivered a web-based solution for the creation and management of customer and vendor master data, implemented an optimized messaging and hub services capability in support of the Global Combat Support System-Army (GCSS-Army) supply functionality and distribution of master data to Army and non-Army trading partners. The program has also stood up and accredited a fully operational production data center to enable these capabilities.

The **Army Human Resource System (AHRS)** provides tools to locate, manage and serve the soldier—anywhere in the world. The AHRS is a human-resources solution that supports strategic and tactical management of soldiers to ensure warfighter accountability and enhance personnel services.

Army Knowledge Online/Defense Knowledge Online (AKO/DKO) is a single point of entry into a robust knowledge management system within the Army. AKO is available to active Army, Army Reserve, Army National Guard, Department of the Army civilians, Army retirees and Army-sponsored guests. Defense Knowledge Online serves the broader Department of Defense community and will leverage the AKO infrastructure to provide DoD and joint users with access to a growing network of defense/joint enterprise services. Under phase one of the Defense Department's launch of Defense Knowledge Online, servicemembers from the Defense Information Systems Agency, the Air Force, the Navy, the Marine Corps and the Joint Forces Command are eligible for unsponsored AKO accounts. Initially, DKO offers the same services to users as those available to AKO account holders with the exception of some Army-unique applications or Army-funded programs based on the Army population.

Acquisition, Logistics and Technology Enterprise Systems and Services (ALTESS) is the guardian of the Army's acquisition data. Using advanced technologies and established business processes, we provide the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology and the Army Acquisition Executive with full PEO/PM life-cycle management and budget tools. Our state of the art Network Operations Security Center (NOSC) allows real-time situational awareness of enterprise systems and service. ALTESS' strategic foundation focuses on people, processes and technology and uses proven business methods such as Lean Six Sigma and Information Technology Infrastructure Library (ITIL). ALTESS has become a world-class service provider, giving our clients and partners the best possible service as well as providing America's warfighters with decision-making information worldwide.

Computer Hardware, Enterprise Software and Solutions (CHESS) is the Army's designated "primary source" for commercial IT. CHESS provides a no-fee flexible procurement strategy through which an Army user may procure IT hardware, software and services via an e-commerce-based process. Offering simple, straightforward contract vehicles through its online Army e-commerce ordering system, CHESS provides continuous vendor competition for best value and consolidation of requirements to maximize cost avoidance and leverage the Army's buying power.

Defense Communications and Army Transmission Systems (DCATS) supports joint warfighters, major commands and combatant commanders with dedicated satellite ground components and long-haul terrestrial microwave communications systems, tech control facilities, command center upgrades, base radios, combat vehicle intercom systems and deployed forces infrastructure. Project Manager DCATS manages a suite of more than 100 projects and special programs worldwide. With a track record of proven success since 1967, PM DCATS provides the long-haul connectivity customers need—using microwave, satellite, fiber optic or copper cable links—regardless of distance, terrain or other impediments.

The **Army Defense Integrated Military Human Resources System (Army DIM-HRS)** is a congressionally mandated system designed to provide the Army with integrated, multicomponent personnel and pay. This system will create one personnel record per soldier for the soldier's entire career and will automate pay procedures

so that personnel actions automatically trigger associated pay events. The web-based system will also feature a self-service capability that allows servicemembers to update portions of their personal information 24 hours a day.

Distributed Learning System (DLS) acquires, deploys and maintains worldwide distributed learning online courseware to ensure that soldiers receive critical training for mission success. Through the Army learning management system (ALMS), DLS delivers training to soldiers, manages training information, and provides training collaboration, scheduling, and career planning capabilities in both resident and nonresident training environments.

DoD Biometrics. The Office of the Project Manager DoD Biometrics will design, engineer, develop, acquire, deploy and sustain an enterprise biometric system and family of systems configurable for multiple operational mission environments, enabling identity superiority across the Department of Defense.

The **Force Management System (FMS)** will directly support the Army force management director's mission of managing and allocating manpower and force structure information, documenting unit models (requirements and authorizations) over time and providing organizational/force structure solutions in support of the Army's transformation toward the future force. FMS is the Army's system to support the DoD J-8 global force management data initiative (GFM DI). FMS is the application to implement the Army's single organizational document effort. The project consists of replacement of four current systems used by the force management community (requirements documentation system, client-server), the Army authorization documentation system family (TAADS, WINTAADS, WEBTAADS), force builder/SACS, and structure and manpower allocation system, client-server (SAMAScs). The development of RDScs and SAMAScs represents an interim step in the integration process; these systems have been removed from expensive and manpower-intensive mainframe operations and relocated to client-server platforms, providing cost and manpower savings to the Army. The FMS incorporates common software development tools and design and development standards, complying with DoD and Army architecture standards. It provides for browser-based Web accessibility, online transaction processing and online analysis processing capability to users in the community with approved access. The integrated system will provide consistent and standardized data, incorporating government and industry standards for security. The design also provides for online data warehousing of archive data and streamlined system maintenance.

Global Combat Support System-Army (GCSS-Army). Project Manager GCSS-Army oversees the implementation of the field ERP component of a single Army logistics enterprise (SALE) to execute end-to-end (E2E) logistics, and integrate/interface with applicable C^2 and joint systems. GCSS-Army is the primary tactical logistics enabler and combat multiplier to achieve Army transformation and the logistics combat support/combat service support (CS/CSS) transformation vision for the logistics domain. GCSS-Army will permit logistics commanders and staffs at the tactical level to anticipate, allocate and synchronize the flow of resources across the area of operations in support of the Army service component commander (ASCC) and joint force commander (JFC). As a system for near-real-time logistics management, the Web-based system, supported by lightweight mobile applications, provides essential functionality for limited disconnected operations and robust deployable communications connected to a centralized data repository for all users at all echelons. It will replace 13 Army logistics systems and interface or integrate with applicable Army command-and-control systems and joint systems as a follow-on initiative. Future increments of GCSS-Army will provide additional maneuver sustainment automation including, but not limited to, legal affairs, ministry, bulk fuel, tactical financial operations, water supply and distribution; field services; arms room operations; tool room operations; and clothing issue points. These future increments will also rationalize capabilities and services across domain architectures using Army integrated architecture standards, processes and transition planning for future integrated solution opportunities.

General Fund Enterprise Business System (GFEBS) is a web-enabled enterprise resource planning (ERP) system that will allow the Army to share financial, asset and accounting data across the service. The system will standardize transactional input and business processes across the Army to enable cost-management activities; provide accurate, reliable and real-time data; and tie budgets to execution. For the first time, the Army will have a single authoritative source for financial and related, nonfinancial data for its entire general fund (system of record).

Installation Management Systems-Army (IMS-A) provides the Army with information technology solutions that improve efficiency and provide standardization for day-to-day functional processes associated with managing Army installations. The products and services of the installation support modules system and the range facility management support system provide information management technology to Army commanders to process, train, equip, mobilize, deploy, sustain and separate the Army's warfighting force. The Project Office Installation Management Systems-Army designed, developed and fielded the installation support modules system to facilitate the execution and operation of specific installation-level functional business processes and to provide standardized software applications for use throughout the Army.

Information Technology Systems (ITS). The mission of Program Director ITS is to

PEACE

ROLL 6,982,461 SCENE 42,794,327 TAKE 946,432,987

Director ANYONE

Date ANYTIME   HR DAY NITE

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renovate and modernize all Pentagon voice, data and video systems in support of the military services, the Office of the Secretary of Defense, and Department of Defense command-and-control and operations centers.

Product Manager Joint-Automatic Identification Technology (PM J-AIT) manages the web-based radio frequency in-transit visibility (RF-ITV) system for DoD, NATO and coalition partners in support of expeditionary logistics and the joint warfight. RF-ITV is a fielded system that uses wireless technology to capture and pass information about resources at rest or in motion throughout the global supply chain. This worldwide network of more than 5,000 read-and-write stations is used for tracking active radio frequency identification (RFID) tagged shipments, providing soldiers with the confidence of knowing where their supplies are and ensuring materiel arrives on time at the correct destination.

Logistics Modernization Program (LMP). The U.S. Army's LMP provides a comprehensive, modernized logistics solution that allows Army Materiel Command (AMC) to provide world-class logistics readiness to the warfighter. Operational since July 2003, LMP delivers a fully integrated suite of software and business processes that streamline the maintenance, repair and overhaul, planning, finance, acquisition and supply of weapon systems, spare parts, services and materiel to warfighters deployed around the world. It manages a multibillion-dollar inventory with tens of thousands of vendors, and it is integrated with more than 70 Department of Defense systems.

Medical Communications for Combat Casualty Care (MC⁴) is a comprehensive medical information system, enabling lifelong electronic medical records, streamlined medical logistics and enhanced situational awareness for Army tactical forces. MC⁴ integrates various software products, including the joint government software,

onto a variety of ruggedized Army hardware devices, including ruggedized handhelds, laptops, servers, printers and peripherals. When integrated, the MC⁴ system of systems enables the digitization of inpatient and outpatient care, patient tracking and reporting, medical logistics automation and medical situational awareness. The system is engineered to work in austere communications environments, providing the necessary store-and-forward capability to the deployed medical workforce, thus ensuring no gaps in patient data recording. In addition, MC⁴ integrates a number of commercial and Army-unique applications to support user requirements, such as blood management, post-deployment health assessment and voice recognition software capabilities. Following extensive testing and integration, MC⁴ provides comprehensive customer services to ensure user success with the system, including fielding, training and supporting MC⁴ systems in the United States and on the battlefield. Deployed, mobile MC⁴ technical support teams provide a unique, frontline service to the customer that has proven to improve system use and proficiency, leading to better data integrity and the formation of electronic medical record (EMR) best business practices.

The **Movement Tracking System (MTS)** is the keystone to bringing logistics into the digitized battlefield of the 21st century. The system provides the technology necessary to communicate with and track tactical wheeled vehicles (TWV) and other select combat service/combat service support (CS&CSS) assets and cargo in near-real time, enabling safe and timely completion of distribution missions. MTS is used to support missions through the full spectrum of military operations from peacetime to war. Through the use of positioning technology and commercial communication satellites, MTS provides the means for logistics commanders, transportation move-

ment control and CS&CSS operations sections to exercise assured positive control of assets anywhere in the world. MTS is a low-cost solution designed for the Army and its logistics vehicle operators to identify the position and track the progress of vehicles, personnel and cargo, and communicate with the operators of TWVs while on and off the road during war or peacetime. MTS is a mobile satellite two-way messaging system that is totally wireless from the MTS-equipped vehicles to the control station. The mobile configuration of the system is mounted on a unit's vehicles, and the control station configuration, in a fixed location, monitors vehicle locations. Communication between the two is provided via commercial satellite that enables units to send and receive traffic over the horizon, anytime, anywhere.

The **Network Service Center (NSC)** optimizes information delivery through the acquisition and integration of information technology infrastructure that provides a synchronized, seamless information capability in support of the Army's transformation to a modular, netcentric, expeditionary force. Project Manager NSC provides core LandWarNet data backbone and telecommunications infrastructure upgrades and modernizations to worldwide Army installations in support of reachback, global information grid (GIG), GIG bandwidth expansion (GIG-BE) and netcentricity. PM NSC is responsible for providing enterprise solutions in support of the Army knowledge management (AKM) goal to "manage the infrastructure as enterprise to enhance efficiencies and capabilities."

Reserve Component Automation Systems (RCAS) support the Army National Guard and the Army Reserve by providing standardized, sustainable, supported and secure automated information solutions that contribute to the increased readiness of the reserve components. RCAS is an integrated suite of software products and automated information systems that significantly improve the ability of RC soldiers and units to accomplish day-to-day unit administration. RCAS has been serving the soldier since the 1990s through the development and sustainment of infrastructure, hardware and readiness software products and solutions.

Transportation Information Systems (TIS). Project Manager TIS supports the joint logistics (distribution) process through improving efficiency and interoperability within the Army transportation information systems for deployment, sustainment and redeployment activities during peace and war.

Joint PEO Joint Tracked Radio System

In addition to the Army PEOs, the future of U.S. Army warfighter C⁴I capabilities is also being crafted within the **Joint Program Executive Office for the Joint Tactical Radio System (JPEO JTRS)**. The JTRS program was initiated in 1997 to consolidate what had been multiservice searches for separate solutions to replace their existing legacy radios. The program was restructured under a joint program executive office in 2005.

JTRS is developing an "open architecture" of radio waveform technology that allows multiple radio types to communicate with each other. The stated goal is to produce a family of interoperable, modular, software-defined radios that operate as nodes in a network and to ensure secure wireless communication and networking services for mobile and fixed sites. Moreover, these goals extend to U.S. allies, coalition partners and, in time, to disaster response personnel.

The program currently encompasses six ACAT 1D programs: airborne, maritime/fixed station; ground mobile radios; consolidated single-channel handheld radios; multifunctional information distribution system; handheld, manpack and small form-fit; and network enterprise domain.

Airborne, Maritime/Fixed Station (AMF). AMF JTRS consists of a two-channel small airborne (SA) joint tactical radio, a four-channel maritime/fixed (M/F) JTR, and common ancillaries to support platform integration. Increment I AMF JTRS-SA will provide the mobile user objective system (MUOS); wideband networking waveform (WNW); soldier radio waveform (SRW); Link-16, SINCGARS ESIP; Have Quick II (HQ II); VHF FM military tactical; and UHF AM/FM PSK military tactical waveforms. It will also be integrated into a variety of airborne platforms including Army rotary-wing, UAV aircraft and Air Force C-130s. Increment 1 AMF-M/F will support the UHF SATCOM and MUOS waveforms and be integrated into maritime and fixed station platforms such as Navy ships and submarines, Air Force command-and-control (C²) centers and Navy shore C² installations.

Ground Mobile Radios (GMR). JTRS GMR, a software-defined, multichannel, multimode communications system, can be reconfigured to emulate and interoperate with current force radios as well as operate new, advanced waveforms that have enhanced performance capabilities. GMR provides secure communications and enables simultaneous multimedia communications over independent channels to ground vehicle platforms such as: system integrated command post system carrier, Abrams tank, Bradley fighting vehicle, Humvee, expeditionary fighting vehicle and the light armored vehicle. GMR will interoperate with current force equipment in use in civilian and military operations.

Consolidated Single-Channel Handheld Radios (CSCHR). Currently available are two handheld, single-channel, software-defined radios, with options for vehicle adapter amplifiers (VAAs) and accessories. These handheld radios—the AN/PRC-148 and AN/PRC-152 and their associated VAAs, the AN/VRC-111 and AN/VRC-110—are interoperable with other military radios and commercial systems through instantiation of legacy waveforms (for example, SINCGARS, Have-Quick II and ANDVT). NSA-certified and considered "JTRS-approved," these products are presently deployed in combat, aiding U.S. warfighters in Iraq and Afghanistan.

Multifunctional Information Distribution System (MIDS). JTRS MIDS is a wireless, jam-resistant and secure information system providing TACAN and Link-16/Voice to Airborne, Ground and Maritime warfighting platforms. It provides real-time information and situational awareness via digital and voice communications. The MIDS program includes MIDS-Low Volume Terminal (MIDS-LVT), which is in full rate production, and MIDS JTRS, an evolutionary development product that is currently in limited production. MIDS JTRS is a "form-fit-function (plus)" replacement for MIDS-LVT and possesses three additional channels for hosting other JTRS waveforms as requested by platforms.

Handheld, Manpack and Small Form-Fit (HMS). The future of tactical radio communications is being defined by the need for smaller, lightweight and more powerful devices that are interoperable and flexible. HMS is developing small form-fit factors that provide tactical networking for soldier-carried handheld and manpackable radios, unmanned ground vehicles, munitions and sensors, and unmanned aerial vehicles. These cost-effective radios will enable netcentric operations to move beyond the command center to battlefield locations previously unreachable by legacy radios.

The **Network Enterprise Domain (NED)** develops and delivers portable, interoperable, transformational networking waveforms (for example, WNW, SRW, MUOS), legacy waveforms to maintain current force interoperability (for example, UHF SATCOM, SINCGARS, EPLRS) and network management and enterprise network services software to fully enable JTRS' mobile, ad hoc networking capability. NED products will produce the networking capability that allows U.S. warfighters at the tactical edge from all military services to access and share relevant information in real time. This program is the heart of the interoperable networking capability of JTRS.