ATP 3-01.50

Air Defense and Airspace Management (ADAM) Cell Operation

April 2013

Headquarters, Department of the Army

Army Tactics and Procedures
No. 3-01.50

Headquarters
Department of the Army
Washington, DC, 5 April 2013

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Preface

Doctrine provides a military organization with unity of effort and a common philosophy, language, and purpose. This Army Tactics, Techniques and Procedures (ATP) provides doctrinal guidance and employment TTP for airspace management (ADAM) cell operations.

The purpose of this FM is to provide doctrine on the structure, training, tactical employment and operations of the ADAM cell. There is ADAM cells in the corps, division, brigade combat teams (BCTs) (Heavy, Infantry, and Stryker) and the five support brigades (Aviation, Fires, Battlefield Surveillance Brigade [BfSB], Combat Support Brigade [CSB], Maneuver Enhanced [ME], and Sustainment). In addition to the ADAM cell, the Heavy Brigade Combat Team (HBCT) and Infantry Brigade Combat Team (IBCT) are augmented with the Brigade Aviation Element (BAE) and are referred to as the ADAM/BAE. At the corps and division level of command there are ADAM cells in the TAC (tactical) command posts (CPs) and are referred to as air and missile defense (AMD) cells.

FM 3-01.50 provides basic tactics, techniques, and procedures (TTPs) for the tactical employment of the ADAM cell in the Stryker Brigade Combat Team (SBCT) and the support brigades, an overview of the differences in operation of the ADAM/BAE assigned to an HBCT and IBCT as one unified element, and the AMD cell at higher echelon units. This publication—

- Provides the doctrinal guidance for commanders, staffs, and leaders of the organizations who are responsible for conducting (planning, preparing, executing, and assessing) operations in the corp/division, BCTs, and support brigades.

- Serves as an authoritative reference for personnel developing doctrine (fundamental principles and TTP), materiel and force structure, institutional and unit training, and standing operating procedures (SOPs) for ADAM cell operations. It does not cover deployment; reception, staging, onward movement, and integration (RSOI); or redeployment operations.

- Describes procedures that are intended to be used as a guide and are not to be considered inflexible. Each situation in combat must be resolved by an intelligent interpretation and application of the doctrine set forth in this manual. This doctrine is based on suggestions, insights, and observations from previously developed doctrine and from units and leaders taking part in combat training center (CTC) rotations and Operation Iraqi Freedom (OIF)/Operation Enduring Freedom (OEF).

- Is directed toward the BCT commander, his staff, subordinate commanders, and all supporting units. The manual reflects and supports Army operations doctrine as covered in ADP 3-0, ADP 5-0, ADP 6-0, FM 3-90, and FM 3-90.6. It is not intended as a stand-alone reference for ADAM cell operations; rather, it is intended to be used in conjunction with those and other existing doctrinal resources

.

- Outlines the framework in which all three types of air defense and airspace management (ADAM cell, ADAM/BAE, and AMD cell) will operate as part of a corps/division, BCT, or support brigade. This manual also includes discussions of doctrine that is applicable for a particular type of unit, such as the BfSB of the SBCT.

FM 3-01.50 applies to Army headquarters from brigade through corps. It applies to all Army leaders, especially trainers, educators, force designers, and doctrine developers. Army headquarters serving as a headquarters for a joint force land component or joint task force should refer to appropriate joint doctrine, policies, and regulations.

ATP 3-01.50 has an introduction and four chapters. It augments, but does not replace, the planning doctrine in ADP 5-0 and the MISSION COMMAND (MC) doctrine in FM 6-0. It expands MC doctrine regarding decision making, assessment, and exercise of MC during execution.

- The Introduction details the role of doctrine. It also expands upon the manual's purpose and summarizes the doctrinal changes it contains.

- Chapter 1 provides an overview of the ADAM cell and details its missions and roles in the protection cell, airspace command and control, and airspace management. It also describes the ADAM cell equipment.

- Chapter 2 details the different echelons at which the ADAM cell will be used. It expands the operations process and discusses how several processes integrate during the planning, preparing, executing, and assessment activities of an operation. It reinforces the commander's role in exercising MC and the staff's role in supporting the commander and subordinate commanders.

- Chapter 3 details command and control, war fighting functions, military decision making, and communications. It explains the various processes involved during the integration of planning, preparing, executing, and assessing activities of an operation. This chapter also reinforces the commander's role in exercising MC and the staff's role in supporting the commander and subordinate commanders. Communications requirements for effective employment of the ADAM cell are also described.

- Chapter 4 broadens the doctrine for exercising MC during execution established in FM 6-0. It details the rapid decision making and synchronization process. Also discussed are the Army Battle Command System (ABCS) roles and recommended procedures with the ADAM cell, the common operational picture (COP) recommended procedures and operational process, and specific ADAM cell staff tasks.

- Appendix A describes initialization as it pertains to the user initializing each system safely. It is a composite of checklists used for deployment preparation, powering up the ABCS, establishing digital communications, and creating and distributing ABCS databases.

- Appendix B details the ADAM cell capabilities and operational functions. It also describes AMD and aviation augmentation, with a list and general description of AMD and aviation assets which the maneuver commander may task for operations.

- Appendix C explains the importance of liaison and identifies the key staff sections that the ADAM crew must interface with to accomplish its tactical mission.

Table Preface-1. QSTAGs

Number	*Title*	*Edition*
674	*Message Text Formatting System (FORMETS)*	1
729	*Tactical Area Communications Systems*	1
733	*Technical Standards for Single Channel High Frequency Radio Links*	1
788	*Multi-Channel Tactical Digital Gateway Systems Requirements*	1
789	*Multi-Channel Tactical Digital Gateway Multiplex Group Framing Standards*	1
790	*Multi-Channel Tactical Digital Gateway Signaling Standards*	1
791	*Multi-Channel Tactical Digital Gateway to Digital Conversion of Speech Signals*	1
792	*Multi-Channel Tactical Digital Gateway Cable Link Standards*	1
793	*Multi-Channel Tactical Digital Gateway System Control Standards*	1
794	*Radio Relay Link Standards*	2
1060	*AD Levels of Command*	1
1337	*Electromagnetic (EM) Protection of Digital C_4I in ABCA Operations*	1
2006	*Doctrine for Joint Airspace Control in the Combat Zone*	1
2008	*Principles and Procedures for Establishing Air Defense Liaison*	1
2009	*AD Intelligence Preparation of the Battle Space (ADIPB)*	1
2035	*Automated Mission Planning Systems and Procedures*	1

This publication applies to the Active Army, the Army National Guard/the Army National Guard of the United States, and the United States Army Reserve unless otherwise stated. The proponent of this publication is the United States Army Training and Doctrine Command (TRADOC). Send comments and recommendations on DA Form 2028 (*Recommended Changes to Publications and Blank Forms*) directly to Commandant, US Army Air Defense Artillery School, ATTN: ATSA-C, Fort Sill, Ok 73503 or e-mail the Directorate of Training and Doctrine-Doctrine Division (DOTD-DD) at ada.doctrine@us.army.mil. Find other doctrinal information on the Internet at Army Knowledge On-line or call commercial: (580)558-0314/DSN 495-0314.
Unless otherwise stated, masculine pronouns do not refer exclusively to men.

Introduction

THE ROLE OF DOCTRINE

Doctrine is the concise expression of how Army forces contribute to major operations, battles, and engagements. It provides a common frame of reference across the Army. Rather than establishing a set of too hard and-fast rules, the objective of doctrine is to foster initiative and creative thinking. Doctrine provides a menu of practical options based on experience from which Army leaders can create solutions to tactical problems.

Doctrine facilitates unity of effort by providing a common philosophy and language. This common understanding of how Army forces fight and the doctrinal terms used to describe this understanding facilitate rapid team-building, tailoring, and task-organizing among units and Soldiers. It helps standardize operations and aids readiness by establishing common ways of accomplishing military tasks. Well-established terms and graphics and commonly accepted practices allow for shorter orders. They also facilitate their rapid production, dissemination, and understanding.

The Army is a learning organization. Its doctrine is not static. It continuously revises doctrine based on the ever-changing security environment and lessons from operations. ADP 1 and ADP 3-0 are the Army's two capstone field manuals. They provide the fundamental principles for employing land power. Among many things, these manuals provide overarching doctrinal direction for the conduct of full spectrum operations. The revision of Army capstone and several keystone doctrinal manuals has begun with the publication of the June 2005 edition of FM 1. ADP 1 establishes the Army's operational concept and refines the principle of full spectrum operations. This is a parallel effort with the revisions of Joint Publications (JPs) 3-0 and 5-0.

EMERGING DOCTRINAL REQUIREMENTS

Since the publication of ADP 3-0, there have been significant changes in the security environment (for example, the war on terrorism) and organizational changes in the operational Army (transformation to the modular force). Lessons from ongoing operations and transformation initiatives have revealed several doctrinal, training, and leader development requirements. Doctrinal needs include—

- Expanding full spectrum operations doctrine to better describe how to plan, prepare, execute, and assess stability operations simultaneously with offensive and defensive operations.
- Better describing how to integrate several integrating processes (the military decision-making process [MDMP]; targeting, intelligence preparation of the operational environment; intelligence synchronization; and composite risk management) with each other and throughout the operations process.
- Better describing the roles and functions of command posts, cells within command posts, and the duties and responsibilities of key staff officers.

FOCUS

The focus throughout this manual is how ADAM/BAE supports the fight and sustain of the SBCT, the support brigades, the IBCT and HBCT, respectively, ADAM/BAE, and the division, corps, and Army AMD cell. This ATP describes how the ADAM, ADAM/BAE, and AMD cell optimize organizational effectiveness while balancing lethality, mobility, and survivability against requirements for rapid strategic deployability.

The intended audience for this publication is leaders and staff sections within transforming units. These leaders include those in combined arms chains of command, field and company grade officers, middle-grade and senior

noncommissioned officers, and battalion/squadron and battery/company command groups and staffs. This manual provides guidance for the theater, Army, corps, division, brigade combat team, and support brigade leaders and staffs for training and employment of the ADAM cell to conduct force application and protection operations. This publication may also be used by other Army organizations to assist in their planning for support of unified action.

The ensuing chapters provide basic doctrine in tactics, techniques, and procedures of employment, training, organization, exercise of MC and tactical operations appropriate to the theater, army, corps, division, the brigade combat team, and support brigades. This manual also provides the tactics and techniques to exploit the ADAM cell's range of capabilities, and ensure versatility across the full range of potential requirements. Army branch schools may also use it to assist in teaching ADAM cell operations.

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Chapter 1

Overview

This chapter provides an overview of the ADAM cell. It details its mission and role in the protection cell, airspace command and control (AC2), airspace management, and aviation integration. It also describes the roles that the ADAM cell plays in supporting various missions and the equipment required.

MISSION

1-1. The ADAM/BAE cell is an organic element of the corps, divisions, BCTs, and select support brigades. The ADAM/BAE Cell plan, coordinate, and establish connectivity for unified actions with communications systems ,command and control (C2) and intelligence /controller networks, as well as airspace users; provides situational awareness and early warning; conducts continuous planning and execution of airspace management requirements for the supported unit/echelon; and conducts AMD and Aviation planning and coordination to determine AMD and Aviation requirements across the spectrum of conflict.

ROLES

1-2. The ADAM/BAE cell is integral to three echelons in the Army's transformation to the modular "brigade based" Army. These three echelons are the higher echelon units (corps and division), the BCTs (Infantry, Heavy, and Stryker) and the support BCTs (CSB [ME], BfSB, Aviation, Fires, and Sustainment) as explained below:

- Corps and division are provided with an AMD cell as follows::
  - Corps: An ADAM cell is positioned in the TAC CP. Additional AMD personnel are positioned in the Corps Main CP.
  - Division: An ADAM cell is positioned in both the Division Main CP and TAC CP.
- Brigade combat teams:
  - The Infantry and Heavy BCTs are provided with an ADAM/BAE cell. This element combines AMD personnel and Aviation personnel.
  - The Stryker BCTs are provided with an ADAM cell.
  - The support BCTs are provided with an ADAM cell

1-3. Although each of these cells is fielded with the same equipment (AN/TSQ-253with common equipment), the manning and placement within the headquarters staff section is different in each case. Their functions include—

- Conduct AMD augmentation planning and coordination.
- Conduct Aviation augmentation planning and coordination.
- Conduct composite risk management to minimize the potential for fratricide (air/ground positive/procedural identification, et cetera) for the BCT.
- Provide early warning of enemy aerial attack.
- Develop, display, and disseminate the common operational picture/single integrated air picture (COP/SIAP) to the BCT to provide situational awareness and facilitate situational understanding.
- Contribute to AC2 planning and execution.
- Contribute to joint/local airspace deconfliction.
- Contribute to operational protection.

- Advise and update the commander on adjacent AMD unit location, plans and intent.
- Continuously assesses of AMD augmentation requirements.
- Integrate operations using assigned Army Battle Command System (ABCS) with units/organizations.
- Request, maintain, and disseminate AC2 measures or restrictions.

1-4. The AMD cell (corps and division), ADAM/BAE cell (HBCT/IBCT), and ADAM cell (SBCT and support brigades) are embedded within the echelon headquarters tactical operations center (TOC), to support their AMD and airspace management (AC2) requirements. As a critical component of these organizations, they remain the only organic air defense element assigned to them. The Army developed the BCTs to fill the current operational gap between its heavy and light forces and to create a modular "brigade-based" Army that responds effectively to the needs of geographic combatant commanders. All BCTs have the capability of fighting independently—much as the separate brigade could under the legacy division structure—or a commander can plug it into a larger division/corps. Consequently, a BCT (and its accompanying ADAM/BAE cell) can find itself as an integral component of an early entry force, as part of a division or corps, or as a stand-alone unit. Soldiers assigned to a BCT or support BCT must train and prepare themselves to fight throughout the spectrum of conflict: Peacetime Military Engagement, Limited Intervention, Peace Operations, Irregular Warfare, and Major Combat Operations. The BCT, when deployed, can operate jointly with coalition forces, allies, and other services within the theater. Operationally, the BCT will normally fight under a division or corps headquarters, which acts as the division/corps Army forces or Army joint task force (JTF) headquarters within a joint or combined force command.

1-5. The ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT and support brigades) provide the function of airspace management. The ADAM/BAE is a cell that combines Air and Missile Defense and Aviation personnel along with enhanced digital capabilities to provide the infantry and heavy BCT with an enhanced capability to perform AC2 and maintain a near-real-time airspace picture for airspace management. The Brigade Chief of Operations (CHOPs) is the lead integrator on the infantry and heavy BCT staff for AC2 tasks. The ADAM/BAE cell functions as the staff integrator of C2 to provide the Aviation element the common tactical picture (CTP) for AC2. It coordinates and integrates AC2 throughout the infantry and heavy BCT by relaying appropriate information concerning the COP and airspace management. The ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT and support brigades) coordinates AC2 requirements with higher headquarters and may be required to coordinate with joint or multi-national forces to integrate the BCT airspace operational requirements into the current operations via airspace control means requests (ACMREQ). The Air and Missile Defense Operations Officer (AMDOO) of the ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) is in charge of AMD operations within the ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) and provides the COP for airspace management, better situational awareness for the brigade, and air defense early warning.

1-6. The ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) provide the commander and staff with the aerial component of the COP and ensure that the commander and his staff include AMD and Aviation considerations in routine planning and preparation for operations. By providing commanders access to the ABCS with near-real-time situational awareness of the third dimension, the ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) allow commanders to optimize air battle/airspace management at all levels.

1-7. To accomplish its mission, the ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) link into the integrated air defense system through direct coordination with air defense coordinators above brigade level; for example, the battlefield coordination detachment (BCD), the area air defense commander (AADC), and the Army Air and Missile Defense Command (AAMDC). Through constant coordination, it provides brigade integration and synchronization with joint theater air operations. Some of its duties include integration, correlation, and distribution of the joint and coalition vertical and horizontal air picture, the status of forces and their actual positions, rules of engagement pertaining to third dimension combat, and the relay and dissemination of information and directions received from all levels of command. Throughout the operation, the ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) coordinate and monitor aerial surveillance, air track identification, and threat assessment to protect BCT forces and operations. They also

monitor hostile track engagements if an AMD augmentation force is deployed to support the BCT. As the operation evolves, the ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) work continuously with the BCT staff to ensure the commander's intent with respect to AMD, third dimension situational awareness (SA), and airspace management, is maintained.

REACH

1-8. The ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) equipment provides the commander at all echelons with the force multiplier of "reach." Reach is the ability of a deployed military force to rapidly access information, conduct collaborative information-sharing with, and receive support from, other units deployed in-theater but not in the chain of command and from out of theater assets unconstrained by geographic proximity, echelon, or command relationship. The capability for reach enhances its force effectiveness by allowing the commander and staff to exploit a multitude of nonorganic resources to accomplish assigned missions.

1-9. The staff executes reach on a routine, deliberate basis as a combat power and sustainment multiplier in five primary areas:

- Fires and effects.
- Intelligence and information.
- Planning and analysis.
- Protection.
- Sustainment.

1-10. In addition to enhancing the staffs' ability to accomplish its assigned mission, reach also enhances its operational agility. Reach is executed primarily through army forces, although the army forces may authorize direct linkages between the unit and resource providers when it is prudent and efficient to do so. Staffs must understand the capabilities available through reach and how best to employ them for mission success.

1-11. Reach allows the supporting headquarters to provide detailed analytical support to the unit commander and staff. This support includes anticipating and initiating collection against long lead-time requirements, synthesizing available information on the area of operation (AO), and orchestrating the collection efforts of existing intelligence organizations and sophisticated computer analysis of a course of action (COA) to help speed the MDMP process. The degree of support needed depends on the factors of mission, enemy, terrain and weather, troops and support available, time available and civil considerations (METT-TC) and should be tailored, as the operation develops, to ensure seamless intelligence support. Figure 1-1 depicts the reach provided by the ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) and the degree of interoperability.

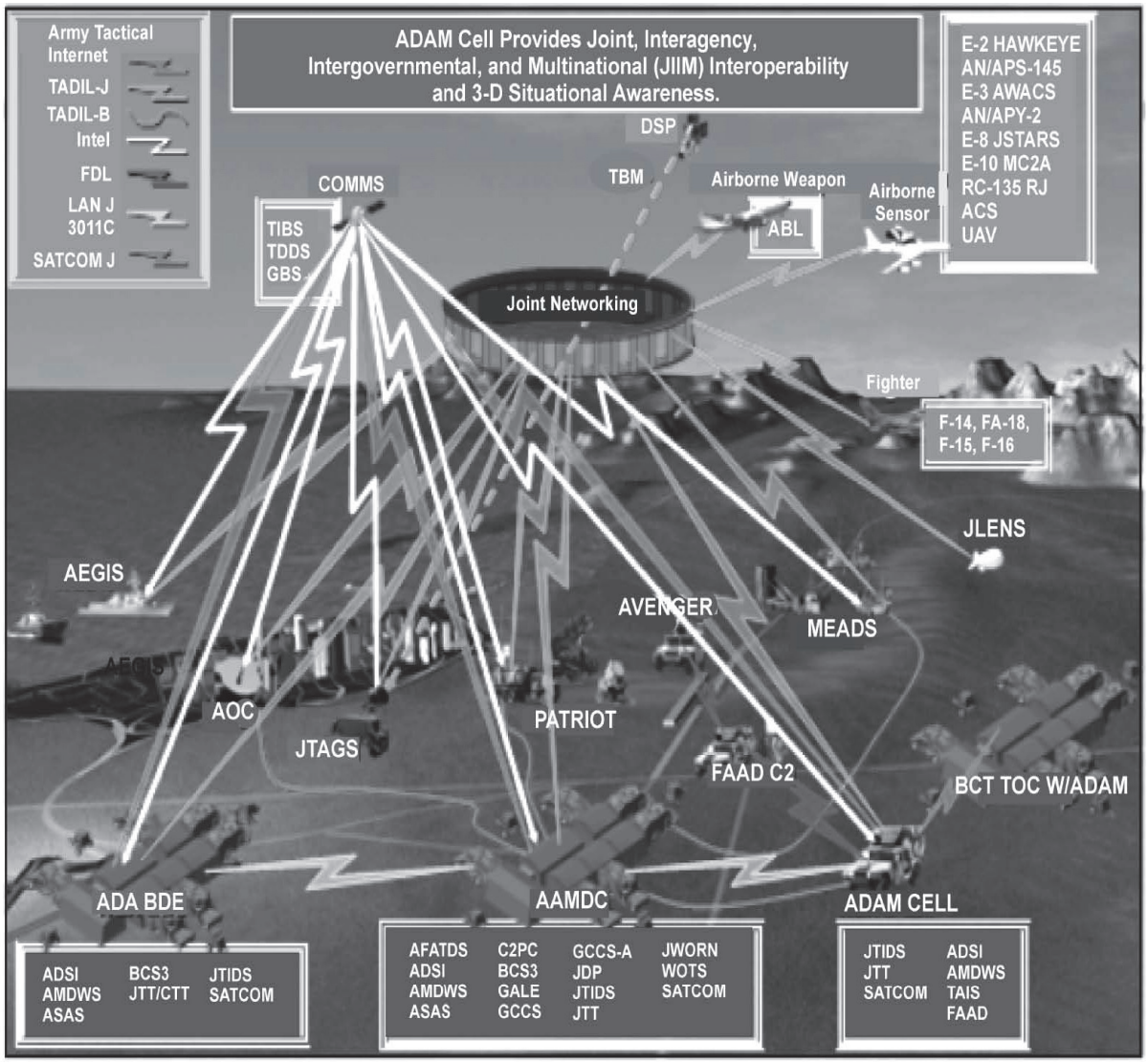

Figure 1-1. ADAM Cell interoperability

ENHANCED SITUATIONAL UNDERSTANDING

1-12. The ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) employ a multilevel, integrated suite of ABCS surveillance assets to develop and share a common operational picture throughout the force. These information systems provide the commander with a unique capability to visualize, describe, and direct the unit through full spectrum operations and terrain in which the unit may be operating.

1-13. The COP is an operational picture tailored to the commander's requirements for information of friendly forces, enemy forces, and the terrain. It is based on common data and information shared with subordinate (or adjacent) commands. Analysis of the COP, together with a commander’s application of his experience, expertise, intuition, and judgment, establishes a relationship among the factors of METT-TC that leads to situational understanding. Situational understanding facilitates decision making by identifying opportunities for mission accomplishment, threats to the force and mission accomplishment, and gaps in information. Although critical information may be available via national and theater reach assets, the

ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) are a major resource for providing data and combat information to build the knowledge base necessary for the unit to achieve situational understanding.

1-14. Due to the extensive reach capabilities, the ISR analytical and management assets have access to intelligence and analysis from sources above the unit in addition to its organic unmanned aircraft systems (UAS). Situational understanding enables the force to avoid surprise, make rapid decisions, control the time and place to engage in combat, shape the operational environment with fires, and achieve decisive outcomes. The ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) are equipped with the ABCS family of systems in order to carry out effective information management and achieve the quality of information sharing needed for effective planning, preparation, and execution of assigned missions.

1-15. Protection encompasses those actions taken to prevent or mitigate hostile actions against personnel, resources, facilities, and critical information. These actions conserve the unit's fighting potential so it can be applied at the decisive time and place and incorporate the coordinated and synchronized offensive and defensive measures to enable the effective employment of the force while degrading opportunities for the enemy. The ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) allow the BCT to meet protection challenges through the application of a variety of capabilities including enhanced situational understanding, situational awareness, and integrating air defense assets.

JOINT, INTERAGENCY, INTERGOVERNMENTAL, AND MUTINATIONAL INTEROPERABILITY

1-16. Although the unit is expected to always operate under army forces command, the SSC environment may require it to maintain direct links with multinational forces and US and foreign governmental and non-governmental organizations involved in the conflict, crisis, or instability. In many situations, the unit will benefit from exploiting the knowledge and capabilities residing within these organizations. Effective interaction is especially important in an environment where the adversary is primarily employing unconventional capabilities rather than conventional military power to achieve an end. In some circumstances, the unit headquarters or subordinate elements actively participate in civil-military activities and may operate subordinate to civil-military organizations. Interoperability with these organizations is essential and is best facilitated through the exchange of a liaison officer (LNO). The fact that the unit communications systems may not be compatible with the civil-military organization increases the need for an exchange of knowledgeable LNOs properly equipped to communicate according to the table of organization and equipment (TOE).

FULL-SPECTRUM OPERATIONS

1-17. The ADAM/BAE cell (HBCT/IBCT) and ADAM cell (SBCT) are manned and equipped to conduct operations in an SSC. However, conditions may develop that require added capabilities not resident within the BCT. When the BCT participates in an MTW, it will do so as a subordinate element of a division or corps. Its mobility and organic ISR assets make it invaluable to a division or corps commander in an MTW. As with any brigade, adjustments to task organization may be required. Likely additions to the BCT task organization may include aviation, armor, engineers, and air and missile defense.

ADAM CELL EQUIPMENT

1-18. The ADAM cell will be used at the SBCT and support BCTs (ME Brigade, Aviation Brigade, Fires Brigade, BfSB, and Sustainment Brigade). The ADAM cell will be used in conjunction with the BAE at the IBCT and the HBCT and will be at the corps, division, and Army headquarters level. The equipment (hardware and communications) within the ADAM cell is described here, as well as system hardware capabilities.

ADAM CELL HARDWARE

1-19. The ADAM cell is comprised of a prime mover, an AN/TSQ-253shelter, and power generation equipment with trailer. See Figure 1-2.

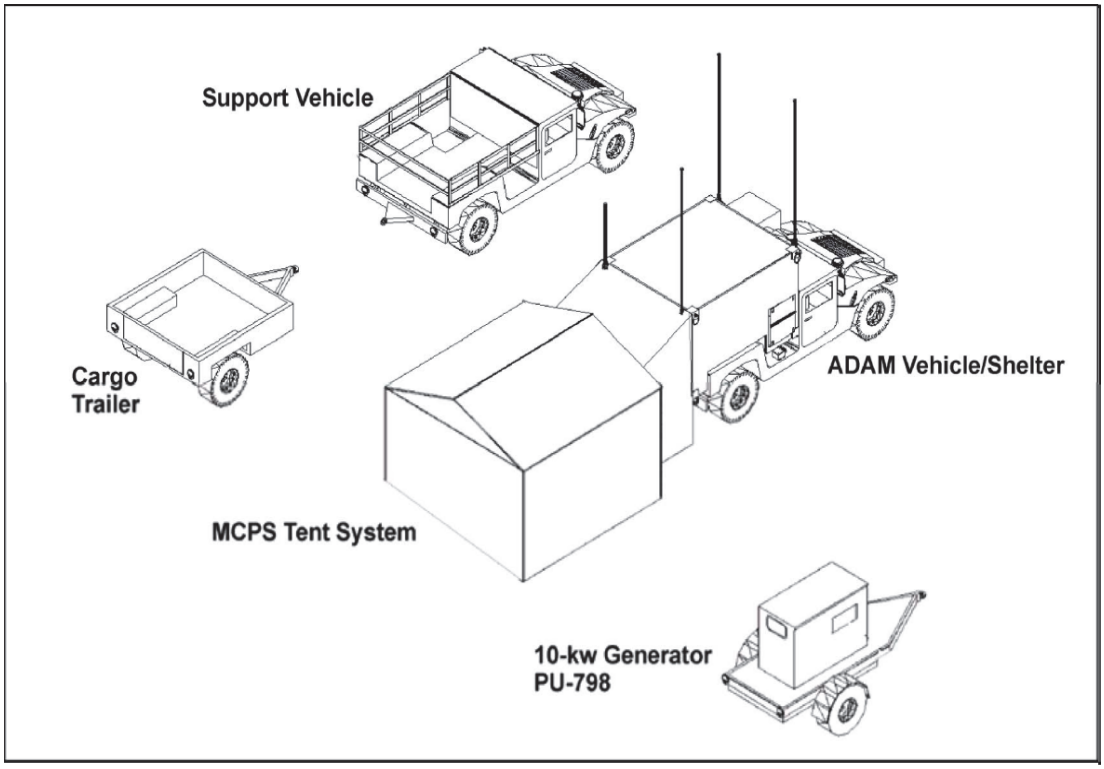

Figure 1-2. ADAM cell

Prime Mover

1-20. An M1113 heavy chassis, high-mobility, multipurpose wheeled vehicle (HMMWV) transports and serves as the bed for the ADAM cell shelter. This vehicle has a stronger load and pulling capacity than the standard HMMWV. The rigid wall shelter (RWS) protects ADAM cell personnel from chemical, biological, radiological, and nuclear (CBRN) attacks and has power, local area network (LAN), and antenna connections on both sides of the structure.

Shelter

1-21. Standardized integrated command post system (SICPS) RWS is a transportable HMMWV-mounted shelter integrated with environmental control unit (ECU), electromagnetic interference (EMI) and circuit breaker (CB) protection, equipment racks, and power/signal wiring. Figures 1-3 and 1-4 illustrate the ADAM command post platform (CPP) layout aboard the HMMWV.

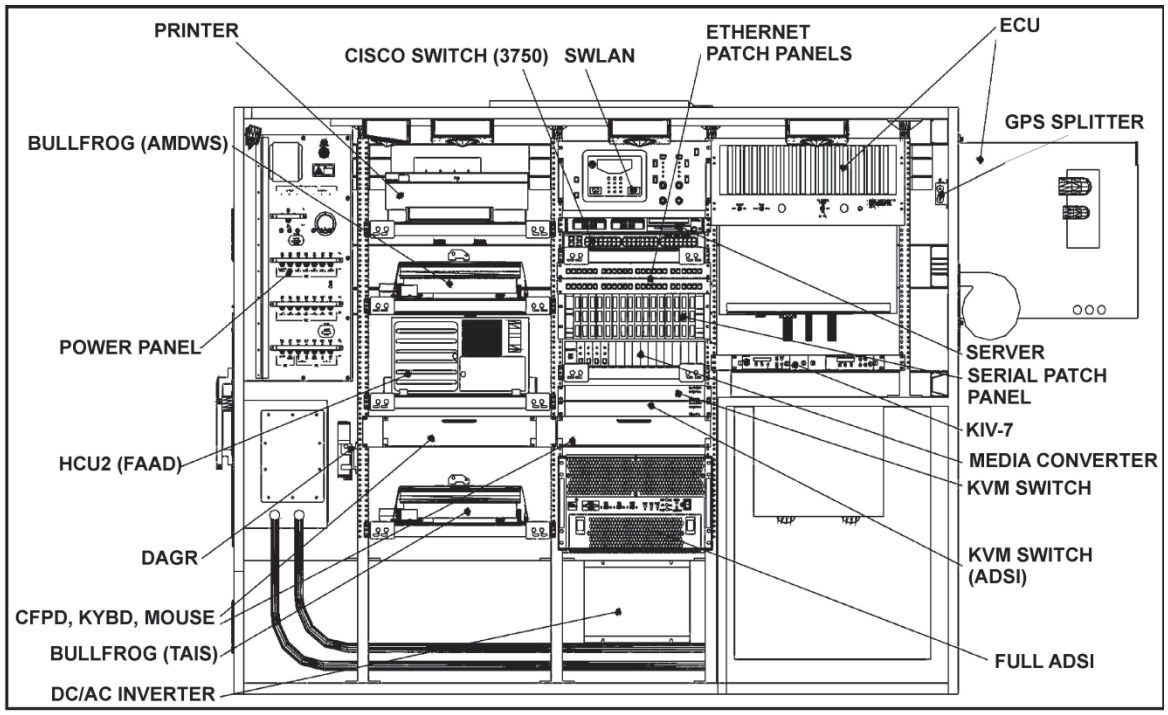

Figure 1-3. Roadside equipment in CPP ADAM cell

- Bullfrog laptop—Solaris/Unix and Windows-based operating system laptop capable of forward area air defense (FAAD) command, control, and intelligence (C2I). FAAD C2I provides the capability to manage air defense engagements to the cell.
- Sun processor console—keyboard/mouse and display for FAAD C2I and the air and missile defense workstation (AMDWS).
- Defense advanced global positioning system receiver (DAGR)—provides precise positioning service (PPS) support and position, velocity, navigation and timing (PVNT) to all missions that involve land-based war-fighting operations.
- Printer—network printer for the CPP ADAM cell.
- Cisco switch (3750)—hubs for the CPP ADAM cell's primary LAN.
- Secure wireless (SW) LAN—wireless LAN component for continuity of LAN while on the move and the initial LAN prior to wire being emplaced.
- ECU—the ECU is for maintaining correct operational temperatures for the equipment inside the CPP shelter.
- Server—Windows server used at the discretion of the user. Can act as exchange server for the unit or as an additional network storage component.
- Serial patch panel—panel used to physically transfer data to multiple components of the CPP ADAM cell.
- KIV-7—Embeddable KG-84 communications security (COMSEC) modules cryptographic devices that provide protection for digital and voice communications.
- Media converter—gigabit Ethernet copper-to-fiber converters combine existing 100-meter category-5(E) UTP and fiber-optic segments to deliver gigabit data across the network.
- Keyboard-video-mouse (KVM) switch for Processor—keyboard, video, mouse processor for the Sun processor.
- Air defense system integrator (ADSI)—the ADSI provides three functions for the ADAM cell:

- A routing capability to support the following tactical digital information links (TADILs): Link 11 and Link 11(via JTIDS/MIDS terminal hosts and JREAP).
- The capability to receive intelligence information from the Integrated Broadcast System (IBS), specifically tactical information broadcast service (TIBS) and Tactical Data Distribution System (TDDS).
- A set of air defense command and control functions to the crew.

- Joint tactical terminal (JTT)—provides access to the IBS system via TIBS and TDDS.
- Multifunction Information Distribution System (MIDS)—provides access to the TADIL-J (Link 16) data network for the receipt of air tracks.
- Crew access unit (CAU)—the primary man-machine interfaces for the TOC net intercommunication system. Interactive screens are presented to the user on the amber electroluminescent quarter video graphics array (VGA) display.
- Enhanced position location and reporting system (EPLRS)—provides robust, on-the-move, high-speed, automated data exchange using a contention-free networking architecture. This guarantees speed of service to time-critical user's w/URO—with unit readout (URO): EPLRS data input control unit.
- AN/VRC-104—provides command and control capability in the high frequency (HF) band. It supports the brigade operations and intelligence net.
- AN/PRC 117 w/battery eliminators—provide command and control capability in the ultrahigh frequency (UHF) and satellite communications (SATCOM) band. Also used to transmit secure data over the satellite network.

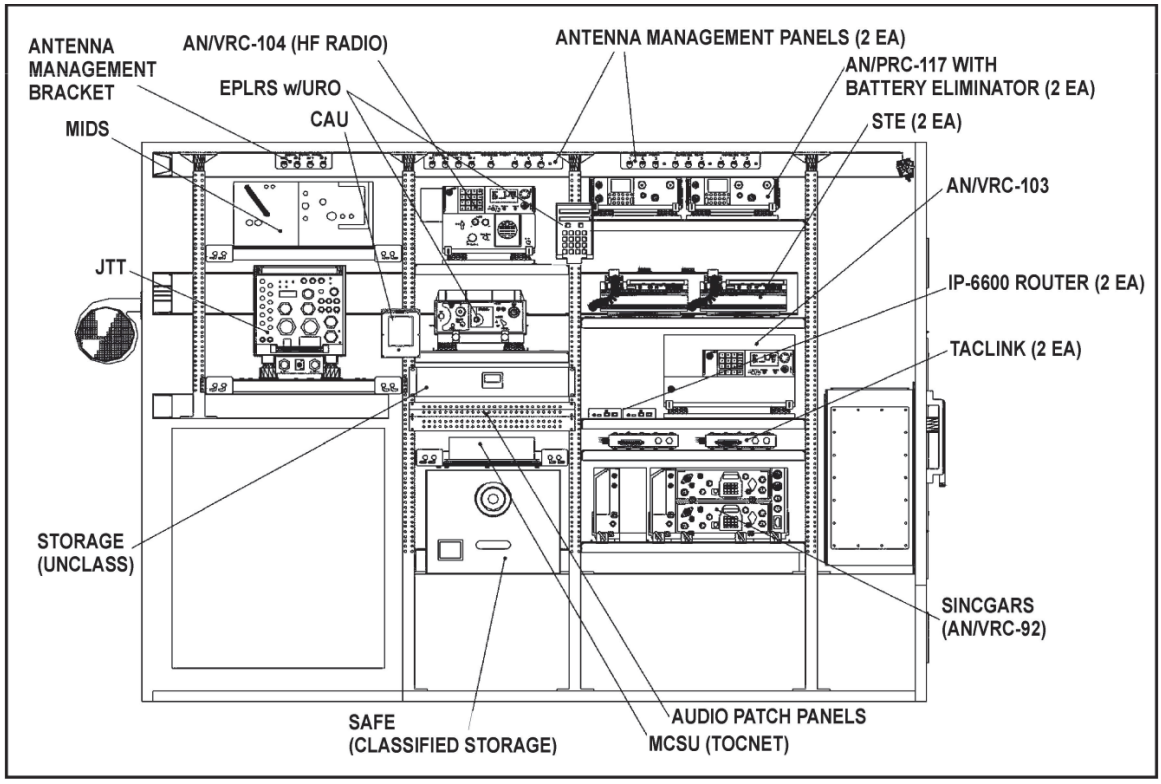

Figure 1-4. Curbside equipment in the CPP ADAM cell

- Secure terminal equipment (STE)—the evolutionary successor to the secure telephone unit Type III (STU-III). The STE program improved secure voice communications by changing out the analog STU-III products with digital-based STE products.
- AN/VRC-103—provides command and control capability in the UHF and SATCOM band.
- IP 6600—industrial rated router featuring two serial ports and two Ethernet LAN ports.
- TAC LINK 2000—provides a modem-like interface for computer workstations employed by joint and multinational military services. Allows data transfer to unique military tactical devices used on the emerging digital battlefield.
- Single-channel ground and airborne radio system (SINCGARS)—provides very high frequency-frequency modulation (VHF-FM) (30 to 88 megahertz) combat net radio communication with electronic counter-countermeasures (ECCM) capability (frequency hopping) and digital data capability (data rate adapter).
- Micro central switching unit (MCSU)—communications platform that provides the operation center voice/data communication throughout the center.
- Safe—provides secure storage for classified material.

Support Vehicle and Trailer

1-22. An M1097 HMMWV transports and serves as the support vehicle for the ADAM cell, along with a high-mobility trailer (HMT) that can carry a 1¼-ton load. This vehicle carries the bulk of the crew and equipment.

The AN/TSQ-253enables the integration of AMD sensors; organizations/agencies; receipt of early warning, intelligence, and broadcast to war fighting functional areas; airspace management; and beyond line of sight (BLOS) receipt of joint picture (not just radio frequency [RF]). See Table 1-1 for AN/TSQ-253system capabilities, linkages, and enabling device. Figure 1-5 illustrates the ADAM cell when remoted from the HMMWV.

Table 1-2. AN/TSQ-253 System Capabilities, Linkages, and Enabling Device

C^4I Resource	Capability
AN/VRC-90	VHF LOS Voice
DAGR	Position

C^4I Resource	Capability
DAGR	Position/Timing
EPLRS	FAAD C^3I Data C^2 & AP)
AMDWS	ABCS/ATCCS
EO WS	FAAD Data Link
AN/VRC-92	VHF LOS Voice
AN/VRC-104(V)3	HF BLOS Voice
AN/USC-62 JTT	Integrated Broadcast System
ADSI	Multi-TADIL Processing
STE	Network Voice
AN/PRC-117	JMTOP SCTACSAT
AN/PRC-117	JRE SAT-J
LAN/WAN	JRE Socket-J
STE	JRE Serial-J
AN/VRC-103	TADIL-A UHF
JTIDS/MIDS	TADIL-J
AN/VRC-92	VHF LOS Voice
TOCNet	Voice/Data LAN

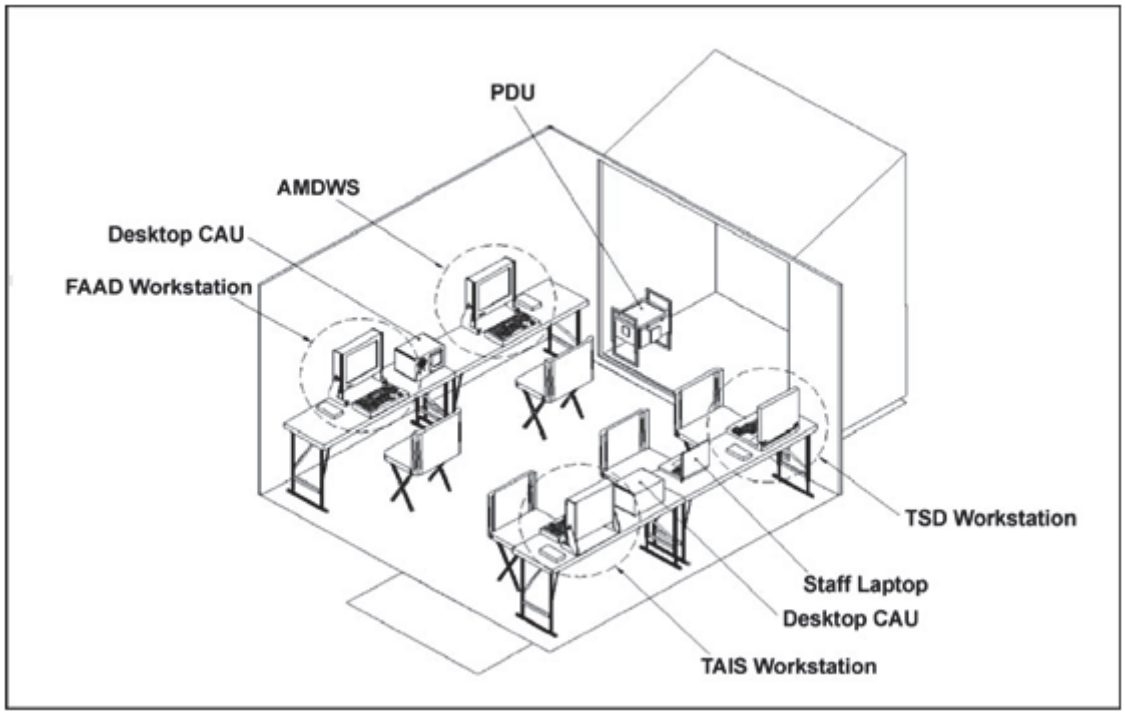

Figure 1-5. ADAM Cell remoted from shelter

Power Generation

1-23. PU 798 tactical quiet generator (TQG) is a trailer-mounted, 10-kw, 60-Hz generator.

COMMUNNICATIONS EQUIPMENT

1-24. MIDS LVT2/Joint Tactical Information Distribution System (JTIDS) is a TADIL J/Link 16 radio. Link 16 is an improved adaptable link used to exchange near-real-time information and is a communications, navigation, and identification system that supports information exchange between tactical command and control (C2), communications systems and intelligence). These high-capacity UHF line of sight (LOS) frequency hopping data communications terminals provide secure, jam-resistant digital data exchange. They operate on the principle of time division multiple access (TDMA) which provides 12-second frames divided into 1535 time slots using 51 frequencies operating between 960 and 1215 Megahertz (MHz) in different hopping patterns. The JTIDS terminals provide precise position determination and a positive self-identification. Forces on-the-move benefits from the terminal's flexibility; the omnidirectional antenna provides 7.5dB gain around the full 360 degrees of azimuth.

1-25. The advanced system improvement program (ASIP) SINCGARS VHF-FM radio set is compatible with all current US and multinational forces VHF-FM. These radios are used for voice or data communications able to communicate in single-channel or frequency hop, in secure or nonsecure mode. They operate between 30 and 88 MHz with a channel separation of 25 kilohertz (kHz), and can change between 100 frequencies per second.

1-26. JTT provides near-real-time tactical intelligence and targeting information, and supplies the critical data link to battle managers, intelligence centers, air defense, fire support, and aviation nodes across all services. The terminals allow Army, Air Force, Navy, and Marine Corps users to exploit TIBS and TDDS. The JTT is a family of special application UHF tactical intelligence terminals which provide the capability to disseminate time sensitive communications system and battlefield targeting information to tactical commanders and intelligence nodes.

1-27. EPLRS is a synchronous TDMA system that provides identification, position, location, and navigation information to a centralized net control station (NCS) automatically. It reports this information to

commanders and supported users within the EPLRS community upon request. It provides near-real-time data communications support to weapon system sensors and other battlefield automated systems.

1-28. The Harris AN/PRC-117 covers the entire 30- to 512-MHz frequency range while offering embedded COMSEC and Have Quick I/II ECCM capabilities. This advanced software reprogrammable digital radio provides 20 watts FM and 10 watts amplitude modulation (AM) transmit power along with Have Quick I/II capability in the UHF band. The system is fully compatible with the transmission security (TSEC)/KY-57 in voice and data modes, including full transmit and receive Savile Advanced Remote Keying (SARK) operations mode. Radio operating parameters and status can be accessed through the remote control capability of the radio. The asynchronous remote control data interface is either RS-232E or RS-422. A built-in-test feature checks system performance down to the module level.

1-29. The Harris AN/VRC-103 multiband, multimission vehicular radio system includes an AN/PRC-117F multiband, multimission tactical radio and the AM-7588 multiband power amplifier. This system covers the entire 30- to 512-MHz frequency range offering 50 watts PEP transmit power, embedded COMSEC, SATCOM, and ECCM capabilities. Fully compatible with the TSEC/KY-57 and the advanced narrowband digital voice terminal (ANDVT)/KYV-5 in voice and data modes, the AN/VRC-103 (V) 1 is also compatible with Fascinator equipment in voice mode and the KG-84C in data mode. Transmit and receive SARK operations are fully supported for each COMSEC interoperability mode. The radio supports both DS-101 and DS-102 fill interfaces and all common fill devices. It also supports a KY-57/VINSON compatible interface to ease backwards interoperability with fielded equipment. An embedded demand assigned multiple access (DAMA) and SATCOM modem complies with MIL-STD-188-181B, -182A, and -183A and is software reconfigurable to accommodate changes to these standards. An external global positioning system (GPS) interface accepts time and position data. The radio is interoperable with the SINCGARS and Have Quick I/II ECCM operation in voice and data modes.

1-30. The Harris AN/VRC-104 is an advanced HF radio which operates from 1.6 MHz to 29.9999 MHz using sky wave (upper side band, lower side band, continuous wave, and amplitude modulation equivalent) modulations with selectable low (1.0 watts), medium (5.0 watts), and high (20.0 watts) output power. It operates from 20.000 MHz to 59.9999 MHz in FM with maximum power of 10 watts.

1-31. Secure terminal equipment nonsecure voice: telephone service interoperable with conventional integrated services digital network (ISDN) and public switched telephone network (PSTN) telephones, STE, and STE and STU-III terminals, narrowband devices and digital nonsecure voice terminal (DNVT). Secure voice: interoperable with other STE, STU-III, or OMNI terminals. Secure facsimile: interoperable with units supported by other STE, STU-III or OMNI terminals. Secure data: interoperable with units supported by other STE, STU-III or OMNI terminals.

1-32. AN/PSN-13, defense advanced global positioning system (GPS) receiver (DAGR) is a self-contained, hand-held, 12-channel, dual-frequency GPS receiver. It uses next-generation GPS receiver technology including “all in view” satellite tracking and the Selective Availability Anti-Spoof Module (SAASM) device to access the precise positioning service (PPS) signal. The DAGR is 3.5” wide by 6.5” high and weighs just less than 1 pound with batteries. It provides highly accurate position, velocity, and timing (PVT) data to individual soldier(s) and integrated platform users. When operated with COMSEC, the DAGR provides enhanced anti-spoof and anti-jam protections. The DAGR supports position location, target location, rendezvous and enroute and terminal navigation. The DAGR is the replacement for the precision lightweight GPS receiver (PLGR), a 5-channel GPS receiver first fielded in 1994. The DAGR will provide ICD-GPS-153 and NMEA 0183 compliant serial data interfaces for weapon system integrations. The DAGR will be delivered with a multi-year manufacturer’s warranty and will be backward compatible with PLGR. Weapon system managers will develop installation kits for specific platforms.

ANTENNAS

1-33. JTIDS (VHF/UHF, JTIDS, and UHF SATCOM systems): Unique capabilities include high power (10,000-watt average) capable antennas, multiband (VHF through L-Band) apertures, as well as rapid erection UHF SATCOM antennas for fixed and portable deployments.

1-34. OE-254 is a bi-conical antenna that uses a BALUN (balanced/unbalanced) transformer to match the 50-ohm coax line and radio to the 200-ohm antenna. It covers the 30- to 88-MHz frequency range without any element adjustments and, therefore, is said to have an instantaneous bandwidth. The OE-254 was designed for frequency hopping and conventional radios and will work anywhere in the 30- to 88-MHz bandwidth

1-35. Quick-erect antenna mast (QEAM) is a manual, screw-drive mast which holds up to a maximum 50 pounds (23kg) of payload and extends to a maximum 50 feet (15m). The QEAMs are available with or without integrated antennas and can be vehicle-, shelter-, or ground-mounted. In addition, guy lines, guy stakes, and erection tools, optional mounting brackets for HMMWV variants, armored personnel carriers (APCs), and shelters are available.

1-36. SATCOM antennas are as described below:

- AV 2040 is a foldable, manpack, high gain, and UHF SATCOM antenna designed for special missions where portability and high gain are required. It has a frequency range of 240 MHz to 400 MHz
- AV 2011 is a foldable, high gain, UHF SATCOM antenna designed to withstand wind loading in excess of 80 miles per hour. This high performance antenna can be set up and deployed in less than 3 minutes using arctic gloves. The AV 2011 antenna system is directly compatible with AN/PSC-3, AN/WSC-3, URC-110, HST-4A, LST-5B, AN/PSC-5, AN/PSC-117 or equivalent ground, shelter or manpack communication systems. It has a range of 240 to 318 MHz
- Near Vertical Incidence Skywave (NVIS) is an antenna with a very high radiation angle, approaching or reaching 90 degrees and used to establish reliable communications over a radius of 0 to 300 miles. NVIS was used in World War II and again in Vietnam to provide tactical communications under various topographic conditions.
- AT-197 antenna, discone, is intended for use as an antenna for a ground radio transmitter and receiver such as the AN/GRC-27, AN/GRC-29, and AN/TRC-32 for communication with aircraft equipped with UHF command radio sets and such ground UHF stations as necessary in the UHF terminal area. It is designed to operate at an impedance of 50 ohms. Its frequency range is 225 to 500 MHz

SYSTEM HARDWARE CAPABILITIES

1-37. The ADAM cell is comprised of the major end items which are described in this section. Also discussed are the equipment capabilities.

AIR DEFENSE SYSTEM INTEGRATOR WORKSTATION

1-38. The ADSI provides interoperability with multiple data links (TADIL A, B, J, LAN J, SATCOM J, and IBS/TBS/TRAP) to provide joint AMD situational awareness and intelligence data to the BCT. The MIDS, JTT, and AN/PSC-5 provide communications support to the ADSI. A multilink C3 system, the ADSI provides operators and commanders from theater level down to the ADAM cell a joint, integrated air picture. To accomplish this, it physically ties into the AMDWS and TAIS and provides routing capabilities to support TADIL A, B, and J; JTIDS; the FAAD data link; North Atlantic Treaty Organization (NATO) Link 1; Army tactical data link 1 (ATDL-1); and the IBS. The IBS offers the crew the ability to receive intelligence and tactical information to include space-based intelligence. The ADSI plays a vital role in the functioning of the AMDWS and TAIS because it feeds tracking and other tactical information it receives via its links to the AMDWS and TAIS processors. Without ADSI input, AMDWS and TAIS cannot perform their jobs of providing AMD early warning (EW) and situational awareness.

1-39. The ADSI provides three functions to the third dimension air picture. First, it provides routing capabilities to support TADIL A, B, and J. It also provides the capability to receive intelligence information from the Integrated Broadcast System, specifically from the Tactical Information Broadcast System and the Tactical Data Dissemination System. Finally, it also provides a set of command and control functions to the crew of the ADAM cell.

AIR AND MISSILE DEFENSE WORKSTATION

1-40. AMDWS is collaborative operational environment awareness, information management system that contributes to combat effectiveness by retrieving, fusing, and distributing time-sensitive information necessary to achieve decision-cycle dominance. AMDWS retrieves battle space awareness information from many sources: joint headquarters, the ABCS network, national intelligence assets, all-source centers, and tactical and strategic sensors. AMDWS uses this information to provide an area-complete, combat-operations display that combines ground-, air- and space-based sensor inputs and command and staff data with automated planning tools. Distribution is accomplished over tactical and special purpose communications in near-real-time, while supporting concurrent interaction with joint MC networks, sensor sources, and ABCS systems. The AMDWS system is the force operations piece of the forward area air defense command, control, and intelligence network system supporting maneuvering ADA units The ADAM cell holds one AMDWS linked to both the FO monitor and the ADSI, where it can obtain external air tracks.

1-41. TAIS provides the ADAM cell the ability to manage airspace in its area of operations and the deconfliction of aerial platforms and objects operating in that airspace. It offers automated airspace MC and air traffic management and deconfliction capabilities for operators and commanders at levels above corps down to the ADAM cell at support brigades. A member of the ABCS, TAIS interfaces with the Air Force's theater battle management core system (TBMCS) and civil and military airspace management systems and agencies. It also links with the ADSI, which feeds it tracking and tactical information. This networking, combined with automation software, allows the operator to provide the commander with a near-real-time, 3-D AC2 picture of the third-dimension operational environment. The operator can also synchronize and deconflict the airspace to prevent fratricide and assist commanders in mission accomplishment.

1-42. The ADAM cell operator accomplishes these tasks from the TAIS workstation (WS), which functions as an airspace information center. From the TAIS WS, the operator can follow flights transiting through BCT airspace, receive and process flight advisories, issue air warnings, and provide real-time positive control of BCT airspace. Automation allows the operator to make this determination in seconds and reroute aircraft, if necessary, to prevent fratricide. The TAIS receives the recognized air picture through several communication links providing near-real-time situational awareness for both friendly and enemy air activity. Visualization of four dimensions, situational awareness, airspace deconfliction, and fratricide avoidance, TAIS receives input from the following:

- ADSI.
- TBMCS.
- CTAPS. (contingency Theater Air Control System automated planning system)
- FAAD C2I.
- TADIL-A Link.
- TADIL-B Link.
- TADIL-J Link.
- International Civil Aviation.
- FAA. (federal aviation administration)

1-43. TAIS will also receive a text message copy of the ACO from the higher Air Force Air Operations Center or the Army's Battlefield Coordination Detachment, then convert the ACO into a graphic format and display it on the flat screen. This precludes the operator from manually inputting the airspace control measures onto the map overlays. An operation that took several man-hours to complete, now takes seconds.

FORWARD AREA AIR DEFENSE C21 WORKSTATION

1-44. The FAAD MC is the engagement operations piece of the ADAM cell element. FAAD MC collects, stores, digitally processes, and displays and disseminates real-time tactical cueing and tracking information, the common tactical air picture, and command, control, and intelligence information to all ADA weapons. FAAD MC also provides the local air picture to joint and multinational forces to protect friendly aircraft and

facilitate management of the air battle. Interoperability and horizontal integration is maintained with all Army air defense systems, including Patriot, the Terminal High-Altitude Area Air Defense (THAAD), and the Medium Extended Area Air Defense System (MEADS). Distribution of the local air picture is with tactical and special purpose radios and includes integration with the airborne warning and control system (AWACS), the ABCS, joint and multinational air and missile defense command and control systems.

1-45. A standard FAAD MC processor also provides the ADAM cell the ability to manage air defense engagements and early warning. Specifically, it provides the Army's FAAD data link (Sentinel radar picture) and controls the air and missile defense engagement operations.

SENTINEL

1-46. The Sentinel radar is an asset organic to all divisions. It is designed to operate in all types of weather, severe electronic countermeasures (ECM) environments and survive antiradiation missile (ARM) attacks. The mission of the Sentinel is to alert and/or cue Avenger of hostile and unknown aircraft (fixed-wing [FW] and rotary-wing [RW]), cruise missiles, and UAS. It also protects friendly forces from fratricide and provides air situational data to command and control centers. Sentinel track data is broadcast to ADA weapons and command posts through the FAAD MC system or, in the event a sensor node is not available, directly to the fire units over EPLRS or SINCGARS. The method of transmission is operator-selectable from the remote control terminal (RCT) during initialization. The Sentinel system consists of an antenna-transceiver group (ATG) mounted on a high-mobility trailer, and a HMMWV group consisting of an M1097A1 HMMWV, a MEP-813A 10-kw, 400-Hz generator, power conditioning equipment, and communications equipment. The system is march-ordered and emplaced by two Soldiers and operated by a single Soldier. It incorporates automatic fault detection and built-in test equipment (BITE). The Sentinel is transportable by aircraft (to include helicopters), rail, or ship. The Sentinel radar is a mobile, compact, modular, multifunction, phased-array radar. It consists of a radar antenna unit mounted on top of the transceiver unit. The radar antenna unit also includes identification, friend or foe (IFF) interrogator, an IFF antenna, and an auxiliary ECCM antenna mounted on a single pedestal that rotates during operation. The antenna unit is lowered by hand crank to the stowed position for road march.

1-47. The Sentinel is essential to the mission in providing a local air picture in the BCT operations area. The ADAM cell will have access to the COP through a variety of communications and air picture linkages. However, these linkages do not provide enough detail to ensure effective management of the local AMD and Aviation assets in operation; for example, the Sentinel is essential for unmanned aircraft system (UAS) identification.

1-48. Track Data: To provide EW, the ADAM cell receives air tracks from external sources such as the Sentinel radar, AWACS, Patriot, AEGIS, and the joint tactical air ground station (JTAGS). The ADAM cell correlates those tracks and sends them to the BCT elements tactically located on the battlefield. The Sentinels receive that air track data, correlate it with their own data, and send the data to supported AMD batteries, platoons, sections, and fire units. To ensure the widest dissemination of EW, the BCT force uses both voice procedures and the ABCS 6.4 network to alert the brigade. All descending echelons repeat the EW. The ADAM cell operators verbally notify the BCT TOC of an air attack and then transmit a free-text message to all subordinate battalion TOCs, which triggers them to display the current air picture on their ABCS systems. Future force capabilities may facilitate digital EW to the maneuver forces via the Force XXI battle command—brigade and below (FBCB2).

1-49. Digital warning messages from higher sources can arrive directly from the origin sensor or via networks. Additionally, digital air attack EW may originate internally within the BCT when air defense sensors are employed. If the AMDWS is configured to alert when hostile criteria tracks approach preset volumes, the AMDWS will automatically generate digital alerts. For example, when a hostile track crosses an established “Dynamite line,” the AMDWS alerts the operator and generates E-500 (air strike warning) messages. When the operator clears the alert, these digital warnings are sent to addresses on the networked LANs of the brigade.

Chapter 2
Operational Environment

This chapter details the different echelons at which the ADAM cell (AN/TSQ-253) will be used. Also discussed are the personnel required and their duties and responsibilities, broken down by echelon. Finally, a list of ADAM cell staff tasks is provided

PERSONNEL COMPOSITION

2-1. The ADAM cell is embedded in three echelons and shall be discussed below by echelon. The personnel positions and their duties and responsibilities are as follows:

CORPS

Corps Main CP/Current/AMD

- Air Defense Officer (14A/O4) Chief, AMD Plans—The AMD advisor to the corps commander for current operations. An air defense major serves as the AMD operations officer in charge (OIC) of the Corps Main AMD Section and is the AMD current plans coordinator and briefer.
- Air Defense Officer (14A/O3) AMD Plans Officer—Assists the Chief, AMD Plans, and assumes his duties and responsibilities in his absence. Ensures that the OIC knows the status of database updates, report generation and distribution, database replication, and plotting of friendly and enemy unit current location and movement. Ensures generating of graphics pertaining to situational awareness and third-dimensional operations is updated and accurate. Oversees operators on the AMDWS, ADSI, FAAD MC processor, and the command and control radio systems.
- Noncommissioned officer in charge (NCOIC) (14Z5O/E8) Operations Sergeant, Corps Main CP AMD cell—supervises all aspects of operations within the Corps Main CP AMD cell during high-intensity operations. Supervises engagement operations, emplacement, and march order; setting up; hooking up; and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. Updates the TAC CP NCOIC on Corps Main CP current personnel and equipment status.
- AMD Noncommissioned officer (NCO) (14J4O/E7) Assistant Operations Sergeant—Assists operations sergeant in the supervision of operations. Otherwise, performs same duties as operations sergeant during periods of low-intensity operations.
- AMD NCO (14J2O/E5x2) Assistant Operations Sergeant/Early Warning System (EWS) Team Chief—Responsible for: database updates; report generation and distribution; database replication; plotting of friendly and enemy unit movement; generating graphics pertaining to the air battle; performing engagement operations reporting, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. During operations, mans the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems. Like the other members of the AMD cell, also cross-trains and operates all other equipment within the AMD cell to help alleviate personnel understaffing.
- AMD Operator (14J1O/E4) Operations Assistant—Operates the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems. Performs database updates, report generation and distribution; engagement operations reporting, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited

troubleshooting to allow for normal operations. Cross-trains and operates all other equipment within the AMD cell to help alleviate personnel understaffing.

- AMD Operator (14J1O/E3) Operations Assistant—Operates the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems. Performs database updates; report generation and distribution; engagement operations reporting, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. Cross-trains and operates all other equipment within the AMD cell to help alleviate personnel understaffing.

Corps TAC CP/Protect/AMD

- Air Defense Officer (14A/O5) Chief, AMD Operations—the primary AMD operations advisor to the corps commander. An air defense lieutenant colonel (LTC) serves as the AMD operations OIC and is the senior AMD planner, coordinator, and briefer.
- Air Defense Officer (14A/O4) AMD Operations Officer—Assists the Chief, AMD Operations, and assumes his duties and responsibilities in his absence.
- AMD Warrant Officer (140A/W3) MC Systems Integrator—Serves as the primary communication systems integrator and is responsible for establishing, integrating, and maintaining all of the corps AMD cell (Main CP and TAC CP) voice and data communications network architecture. Oversees the network and automation management, information security, and connectivity to ABCS, the corps AMD cell LAN/WAN, lower and upper tier tactical Internet, mobile subscriber equipment, brigade subscriber node, JTIDS, and the joint data network (JDN). The warrant officer coordinates and works closely with the G-6/S-6, Signal Company, and subordinate/task organized units to monitor network performance and database configuration and plans system reconfigurations caused by changes in the tactical situation, communications connectivity, and system initialization. Provides situational awareness to the AC2 element and the TOC staff cells. When all links are active, assists in the performance of Air Defense Officer (ADO) duties. The communication system integrator has the enormous job of ensuring the AMD cell remains 100 percent operational 24/7. This position demands a warrant officer certified as a joint interface control officer (JICO).
- NCOIC (14Z5O/E8) Operations Sergeant, TAC CP AMD cell—Supervises all aspects of operations within the TAC CP AMD cell during high-intensity operations. Supervises engagement operations, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. Updates OIC on Corps Main CP and TAC CP personnel and equipment status.
- AMD NCO (14J4O/E7) Assistant Operations Sergeant—Assists operations sergeant in the supervision of operations. Otherwise, performs same duties as operations sergeant during periods of low-intensity operations.
- AMD NCO (14J2O/E5) Assistant Operations Sergeant/EWS Team Chief—Responsible for: database updates; report generation and distribution; database replication; plotting of friendly and enemy unit movement; generating graphics pertaining to the air battle. Performs engagement operations reporting, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. During operations, mans the AMDWS, ADSI, FAAD MC processor, and the command and control radio systems. Like the other members of the AMD cell, also cross-trains and operates all other equipment within the AMD cell to help alleviate personnel understaffing. AMD Operator (14J1O/E4) Operations Assistant—Operates the AMDWS, ADSI, FAAD MC processor, and the command and control radio systems. Performs database updates and report generation and distribution. Performs engagement operations reporting, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. Cross-trains and operates all other equipment within the AMD cell to help alleviate personnel understaffing.

DIVISION

Division Main CP/Current/AMD

- Air Defense Officer (14A/O4) Chief, AMD Plans—The AMD advisor to the division commander for current AMD operations. An air defense major serves as the AMD operations OIC of the Division Main CP AMD Section and is the AMD current operations planner, coordinator, and briefer.
- Air Defense Officer (14A/O3) AMD Plans Officer—Assists the Chief, Division Main CP AMD Plans, and assumes his duties and responsibilities in his absence. Ensures that the OIC knows the status of database updates, report generation and distribution, database replication, plotting of friendly and enemy unit current location and movement, and status of graphics generation pertaining to situational awareness and third-dimensional operations. Oversees operators on the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems.
- NCOIC (14Z5O/E8) Operations Sergeant, Division Main CP AMD cell—Supervises all aspects of operations within the Division Main CP AMD cell during high-intensity operations. Issues reports to TAC CP AMD cell NCOIC regarding personnel and equipment status, to include collocated and task-organized Sentinel sensor section(s). Supervises engagement operations, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations.
- AMD NCO (14J4O/E7) Assistant Operations Sergeant—Assists operations sergeant in the supervision of operations. Otherwise, performs same duties as operations sergeant during periods of low-intensity operations.
- AMD NCO (14J2O/E5x2) Assistant Operations Sergeant/EWS Team Chief—Responsible for: database updates, report generation and distribution, database replication, plotting of friendly and enemy unit movement, and generating graphics pertaining to the air battle. Performs engagement operations reporting, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. During operations, mans the AMDWS, ADSI, FAAD MC processor, and the command and control radio systems. Like the other members of the AMD cell, also cross-trains and operates all other equipment within the AMD cell to help alleviate personnel understaffing.
- AMD Operator (14J1O/E4) Operations Assistant—Operates the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems. Performs database updates; report generation and distribution; engagement operations reporting, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. Cross-trains and operates all other equipment within the AMD cell to help alleviate personnel understaffing.
- AMD Operator (14J1O/E3) Operations Assistant—Operates the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems. Performs database updates; report generation and distribution; engagement operations reporting, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. Cross-trains and operates all other equipment within the AMD cell to help alleviate personnel understaffing.

TAC CP/Protect/AMD

- Air Defense Officer (14A/O5) Chief, AMD Operations—The primary AMD advisor to the division commander. An air defense LTC serves as the AMD operations OIC and is the senior AMD protection planner, coordinator, and briefer.
- Air Defense Officer (14A/O4) AMD Operations Officer—An air defense major serves as the AMD cell's assistant operations officer. Assists the Chief, AMD Operations, and assumes his duties and responsibilities in his absence.
- AMD Warrant Officer (140A/W3) MC Systems Integrator—Serves as the primary communication systems integrator and is responsible for establishing, integrating, and maintaining all of the division AMD cell (Main CP and TAC CP) voice and data

communications network architecture. Oversees the network and automation management, information security, and connectivity to ABCS, the division AMD cell LAN/WAN, lower and upper tier tactical Internet, mobile subscriber equipment, brigade subscriber node, JTIDS, and the JDN. Coordinates and works closely with the G-6/S-6, Signal Company, and subordinate/task-organized units to monitor network performance and database configuration and plans system reconfigurations caused by changes in the tactical situation, communications connectivity, and system initialization. Provides situational awareness to the AC2 element and the TOC staff cells. When all links are active, assists in the performance of ADO duties. The communication systems integrator has the enormous job of ensuring the AMD cell remains 100 percent operational 24/7. This position demands a warrant officer certified as a JICO.

- NCOIC (14Z5O/E8): Operations Sergeant, Division TAC CP AMD cell—Supervises all aspects of operations within the Division TAC CP AMD cell during high-intensity operations. Receives reports from Division Main CP cell NCOIC regarding personnel and equipment status, to include organic and task-organized Sentinel sensor section(s). Supervises engagement operations, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations.
- AMD NCO (14J4O/E7) Assistant Operations Sergeant—Assists operations sergeant in the supervision of operations. Otherwise, performs same duties as Operations Sergeant during periods of low-intensity operations.
- AMD NCO (14J2O/E5) Assistant Operations Sergeant—Responsible for: database updates, report generation and distribution, database replication, plotting of friendly and enemy unit movement, and generating graphics pertaining to the air battle. Performs engagement operations reporting, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. During operations, mans the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems. Like the other members of the AMD cell, also cross-trains and operates all other equipment within the AMD cell to help alleviate personnel understaffing.
- AMD Operator (14J1O/E4) Operations Assistant—Operates the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems. Performs database updates; report generation and distribution; engagement operations reporting, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. Cross-trains and operates all other equipment within the AMD cell to help alleviate personnel understaffing.

BRIGADE COMBAT TEAMS

2-2. Infantry, Heavy, and Stryker BCT ADAM cells are manned the same. In the ADAM/BAE construct, the AMD personnel will provide the AMD functions and the capability to integrate the MC nodes to provide the BAE with the COP. The Aviation personnel provide the AC2 functions at the BCT.

ADAM Cell (HBCT/IBCT)

- Air Defense Officer (14A/O4) AMD Coordination Officer—An air defense major serves as the ADAM cell's OIC and is the senior AD planner, coordinator, and briefer. Coordinates with the HBCT and IBCT AMD units and divisional and corps staff on all AC2 aspects. Air Defense and Aviation personnel man the ADAM/BAE cell. They provide the commander and staff with special area expertise operating out of the main TAC CP. The ADAM cell is responsible for planning, coordinating, integrating, and controlling air defense and airspace management for the HBCT/IBCT, to include developing air defense plans, air defense artillery (ADA) task organization, scheme of air defense operations, and reconnaissance and surveillance planning. This cell also provides integration and coordination tasks between the HBCT/IBCT and any augmented AMD assets and units not directly task-organized to the HBCT/IBCT's subordinate units. The ADAM cell also coordinates aviation operations in support of the HBCT/IBCT, providing the commander with synchronization and control of aviation operations. The ADAM cell assists the staff with these duties, to include AC2 of UAS operations, airspace management,

tactical employment of aviation assets, and positioning of forward arming and refueling points (FARPs).

- Air Defense Officer (14A/O3) AMD Plans Officer—Assists the AMD Coordination Officer (O4) and assumes his duties and responsibilities in his absence.
- AMD Warrant Officer (140A/W3): MC Systems Integrator—Serves as the primary communication systems integrator and is responsible for establishing, integrating, and maintaining all of the ADAM cell voice and data communications network architecture. Oversees the network and automation management, information security, and connectivity to ABCS, the BCT LAN/WAN, lower and upper tier tactical Internet, mobile subscriber equipment, brigade subscriber node, JTIDS, and JDN. Coordinates and works closely with the G-6/S-6 and Signal Company to monitor network performance and database configuration and plans system reconfigurations caused by changes in the tactical situation, communications connectivity, and system initialization. Provides situational awareness of the third dimension to the TOC. When all links are active, assists in the performance of Assistant Division Air Defense Officer (ADADO) duties. The communications system integrator has the enormous job of ensuring the ADAM cell remains 100 percent operational 24/7. This position demands a warrant officer certified as a JICO.
- AMD NCO (14J3O/E6): Operations Sergeant/EWS Section Chief—Mans the ADAM cell during the periods of high-intensity operations. Supervises database updates, report generation and distribution, database replication, plotting of friendly and enemy unit movement, and generating graphics pertaining to the air battle. Supervises engagement operations, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. During operations, mans the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems. Like the other members of the ADAM cell, also cross-trains and operates all other equipment within the ADAM cell to help alleviate personnel understaffing. The EWS Section Chief will find that some of the duties will mirror those of the systems integrator.
- AMD NCO (14J3O/E6x2): Assistant Operations Sergeant/EWS Section Chief AC2—Mans the ADAM cell during the periods of high-intensity operations. Supervises database updates, report generation and distribution, database replication, plotting of friendly and enemy unit movement, and generating graphics pertaining to the air battle. Supervises engagement operations, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. During operations, mans the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems. Like the other members of the ADAM cell, also cross-trains and operates all other equipment within the ADAM cell to help alleviate personnel understaffing. The EWS Section Chief will find that some of the duties will mirror those of the systems integrator.
- AMD NCO (14J2O/E5) Senior EWS Operator—When assigned to the Stryker BCT mans the ADAM cell during periods of low-intensity operations, otherwise during high-intensity operations. Supervises database updates, report generation and distribution, database replication, plotting of friendly and enemy unit movement, and generating graphics pertaining to the air battle. Supervises engagement operations, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. During operations, mans the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems. Like the other members of the ADAM cell, also cross-trains and operates all other equipment within the ADAM cell to help alleviate personnel understaffing.

BRIGADE AVIATION ELEMENT

- Aviation Officer (15B/O4): Brigade Aviation Officer.
- Aviation Officer (15B/O3): Assistant Aviation Officer.
- Aviation Warrant Officer (152DI/W3): Tactical Operations Officer.

- Unmanned Aircraft Systems Warrant Officer (150U)
- Aviation NCO (15P4O/E7): Assistant Operations Sergeant.
- Aviation NCO (15Q3O/E6): AC2 Sergeant.
- Aviation Operator (15P1O/E4): Assistant Operations:
- For additional information of the BAE refer to TC 1-400

SUPPORT BRIGADES

2-3. Stryker BCT and Support Brigade (Fires, Aviation, BfSB) ADAM cell: There is no ADAM cell in the Sustainment or CSB (ME) Support Brigade.

- Air Defense Officer (14A/O3): AMD Coordination Officer—At the SBCT and Support Brigades, coordinates with the SBCT/Support Brigade AMD units and divisional and corps staff on all Army AC2 aspects. Air defense personnel man the ADAM cell. Provides the commander and staff with special area expertise operating out of the main or TAC CP. The ADAM cell is responsible for planning, coordinating, integrating, and controlling air defense and airspace management for the SBCT and support brigades, to include developing air defense plans, ADA task organization, scheme of air defense operations, and reconnaissance and surveillance planning. This cell also provides integration and coordination between the SBCT/support brigade and any augmented AMD assets and units not directly task-organized to the SBCT/support brigade subordinate units. The ADAM cell also coordinates aviation operations in support of the SBCT and support brigade, providing the commander with synchronization and control of aviation operations. The ADAM cell assists the staff with these duties, to include AC2 of UAS operations, airspace management, tactical employment of aviation assets, and positioning of FARPs.
- AMD Warrant Officer (140A/W2): MC Systems Integrator—Serves as the primary communication systems integrator. Responsible for establishing, integrating, and maintaining all of the ADAM cell voice and data communications network architecture. Oversees the network and automation management, information security, and connectivity to ABCS, the BCT LAN/WAN, lower and upper tier tactical Internet, mobile subscriber equipment, brigade subscriber node, JTIDS, and the JDN. Coordinates and works closely with the G-6/S-6 and Signal Company to monitor network performance and database configuration and plans system reconfigurations caused by changes in the tactical situation, communications connectivity, and system initialization. Provides situational awareness to the AC2 element and the TOC. When all links are active, assists in the performance of ADO duties. The communication systems integrator has the enormous job of ensuring the ADAM cell remains 100 percent operational 24/7. This position demands a warrant officer certified as a JICO.
- AMD NCO (14J3O/E5x2) Senior EWS Operator/EWS Team Chief: When assigned to the Stryker BCT, mans the ADAM cell during periods of low-intensity operations, otherwise during high-intensity operations. Supervises database updates, report generation and distribution, database replication, plotting of friendly and enemy unit movement, and generating graphics pertaining to the air battle. Supervises engagement operations, emplacement, and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. During operations, mans the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems. Like the other members of the ADAM cell, cross-trains and operates all other equipment within the ADAM cell to help alleviate personnel understaffing. The EWS team chief will find that some of the duties will mirror those of the systems integrator.
- AMD Operator (14J1O/E4x2) EWS Operator—Responsible for: emplacement and march order; setting up, hooking up, and connecting necessary computers and radios; and limited troubleshooting to allow for normal operations. During operations, mans the AMDWS, ADSI, FAAD MC Processor, and the command and control radio systems, day or night.

Adam Cell Staff Tasks

2-4. Tasks performed by the ADAM cell staff include—

- Announcing TBM launch alerts (via data, voice, and procedure).
- Announcing aerial attack alerts (via data and procedure).
- Assisting reconnaissance, surveillance and target acquisition (RSTA) UAS cell with airspace deconfliction.
- Maintaining situational awareness and the COP.
- Displaying the current battlefield ground and air SA displays, tactical charts, and situation map.
- Verifying that all AMD unit addresses in the brigade MC registry are correct.
- Defining map area to a particular scale, zoom, and center to launch the COP.
- Populating the AMDWS with the current applicable battlefield graphics.
- Establishing chart tabs containing active overlays created by various staff sections.
- Receiving Blue Feed from MCS.
- Receiving Red Feed from ASAS.
- Preparing the intelligence preparation of the battlefield (IPB), ISR, and MDMP.
- Developing AMD force package and employment COAs in support of each brigade COA.
- Developing recommendations as a result of unplanned or extraordinary events critical to the current operation.
- Coordinating with units in theater.

2-5. Tasks for which the ADAM cell officers are responsible include—

- Analyzing aerial threat factors bearing on the battlefield environment.
- Analyzing the effects of weather and terrain on aerial operations.
- Evaluating the air threat.
- Determining aerial threat course of actions (COAs).
- Conducting mission analysis.
- Planning ISR operations.
- Developing an AMD concept of support for each COA.
- War gaming AMD concept of support.
- Comparing COAs.
- Developing an AMD running estimate.
- Preparing an AMD annex.
- Synchronizing AMD operations.

2-6. Tasks for which the EWS NCOs are responsible include—

- Establishing the CTP elements that enable the COP.
- Emplacing the ADAM cell within the brigade TOC.
- Initializing communications networks and connecting the AMDWS, FAAD EO, and radios.
- Initializing the software on the AMDWS, logging into the network, and inserting the initialization parameters.
- Generating an operational map using the defense planner or joint mapping tool kit (JMTK).
- Conducting planning or current operations on the AMDWS.
- Receiving air tracks from live or simulated external sources.
- Displaying the current air picture and situational display.
- Configuring the AMDWS to operate within a dual LAN interface.
- Updating the CTP elements and producing the COP.

- Processing, editing, and sending messages using the configuration management plan (CMP).
- Reading and clearing air track alerts as they are received to provide the commander with a constant situational understanding of the air picture.
- Hooking air track alerts by position, number, sequence, or adjacent track number.
- Displaying supplementary information in the hook information view port as it is received.
- Receiving EW data on the FAAD EO workstation.
- Monitoring and interacting with EW data.
- Generating or modifying selected control measures on the EO box to reflect changing battlefield conditions or movement to new site.
- Initializing the air picture overlay provider and displaying air tracks on the AMDWS.
- Displaying the correct overlays on the mission map.
- Distributing data to other Army tactical MC systems.
- Evaluating the terrain by using CTP mapping tools and digital terrain evaluation data.
- Collaborating by using multimedia tools provided in Microsoft Office and Sun Forum products.
- Writing an OPLAN, operation order (OPORD), fragmentary order (FRAGO), warning order WARNO) or Annex A, and task organization.
- Sending an E500, Air Early Warning Message, from the EO box to the AMDWS.

2-7. In the joint environment, it is essential that the ADAM/BAE or ADAM cell establish links to the following:

- Airspace users (aviation, sensors, other services such as multinational, coalition, Host Nation).
- Other ADAM/multiple ADAM cells (higher/subordinate relationship as well as lateral/adjacent).
- JICO.
- Combined air operations center (CAOC).
- Air defense artillery fire control operations (ADAFCO).
- ADA organizations and systems (AAMDC, AMD battalion, BCD).
- Aviation organizations and systems.

Chapter 3

Communications Architecture

This chapter describes the communications requirements for effective employment of the ADAM cell to include the equipment, architecture, and networks. The ADAM cell is a primary element in the commander's exercise of MC Employment of the ADAM cell relies on effective voice, network, and data communications.

COMMUNICATIONS

3-1. ADAM cell communications requirements are a subset of the overall JTF communications requirements and will compete with other mission areas for limited bandwidth and frequency allocations. Due to differing communications equipment, media capability, and cryptographic capabilities at the units that constitute the JTF, there are significant challenges to interoperability and integration. Follow-on forces flowing into theater must understand the existing JTF communications architecture to ensure they bring the correct capabilities to integrate into the numerous voice and data nets. Normally, the joint force commander (JFC) OPORD and the area air defense plan (AADP) lay the foundation for communications architecture.

3-2. The ADAM cell will establish communications from higher to lower, adjacent, and from supporting to supported. Communications permits not only the data exchange seen in Figure 3-1, page 3-3, but it also facilitates early warning of enemy aerial platforms and permits airspace management.

3-3. There are several radio systems in the ADAM cell shelter that add a high degree of communications ability. First, there are the vehicle radio communication (VRC)-92 and the VRC-90 SINCGARS ASIP radios that provide voice communications throughout the BCT for MC. These radios also provide the data link between the ADAM cell and the Sentinel radar section for the FAAD data link (FDL) picture. The PSC-5 radio provides both voice and data MC in the UHF satellite band. This is primarily for BCT operations and intelligence, and specifically allows the BCT to receive tactical ballistic missile (TBM) alerts. The Harris 150 radio system (voice) is primarily used to support the aviation battalion flight operations net. The MacKay radio system (HF data) is used to gain access to the TADIL-A link. The VRC-103 will be used as an aviation battalion flight operations radio, operating in multiple band frequencies in HF and UHF bands.

EQUIPMENT

3-4. The AN/VRC-100 ground radio is a multifunctional, HF radio communication system intended for use in tactical operations centers, air traffic control, and vehicular applications. It consists of AN/ARC-200 airborne radio line replaceable units (LRUs), a power supply, and an audio interface, all packaged inside a metallic case.

3-5. The AN/PRC-150C is a manpack, multiband tactical radio that provides reliable, long-range, secure, tactical communications. Compatible with the ANDVT/KY-99, ANDVT/KY-100, VINSON/KY-57, and KG-84C cryptographic devices, it eliminates the need for external encryption. An integral Citadel encryption mode offers secure communications interoperability with multinational and Partnership for Peace forces. A removable keypad/display unit allows for easy access to controls while on-the-move.

3-6. The EPLRS is a synchronous TDMA system that provides identification, position location, and navigation information to a centralized NCS automatically. It reports this information to commanders and supported users within the EPLRS community upon request. It provides near-real-time data communications support to weapon system sensors and other battlefield automated systems.

3-7. The JTIDS provides jam-resistant digital communications of data and voice for command and control, navigation, relative positioning, and identification. JTIDS is a TDMA communications system operating at L-band frequencies. It operates over line-of-sight ranges up to 500 nautical miles with automatic relay extension beyond. To defeat jamming efforts, it uses spread-spectrum and frequency hopping techniques. JTIDS can handle large amounts of data and will automatically broadcast outgoing messages at predesignated and repeated intervals.

3-8. The KG-40/40A is a half-duplex digital device used to provide cryptographic security protection for the Navy Link 11 system and any data communications meeting TADIL data standards. It links the computer and the data terminal set.

3-9. The JTT, operating in the UHF band, provides access to the IBS for the receipt of satellite intelligence and targeting information. The JTIDS provides the shelter with access to the TADIL-J network for air tracks while operating in the UHF band. The LST-5 radio operates in the UHF satellite band to provide access to the TADIL-A network for air tracks. An EPLRS radio that operates in the UHF band can communicate with the air defense network.

MISSION COMMAND INFRASTRUCTURE

3-10. The MC infrastructure permits the ADAM cell OIC to collect, process, store, display, and disseminate the information needed to develop a COP in support of the commander's intent and the BCT's mission. The BCT MC infrastructure provides near-real-time access and a complete COP/SIAP to all commanders through available information sources. The MC infrastructure provides the ADAM cell and all commanders with the capability to "see" and have situational awareness of their AO, both ground and air (AMD) units. It provides a shared COP that displays and tracks critical targets, synchronizes simultaneous operations with both lethal and nonlethal means, operates with joint and multinational forces, and recognizes and protects its own forces. See Figure 3-1.

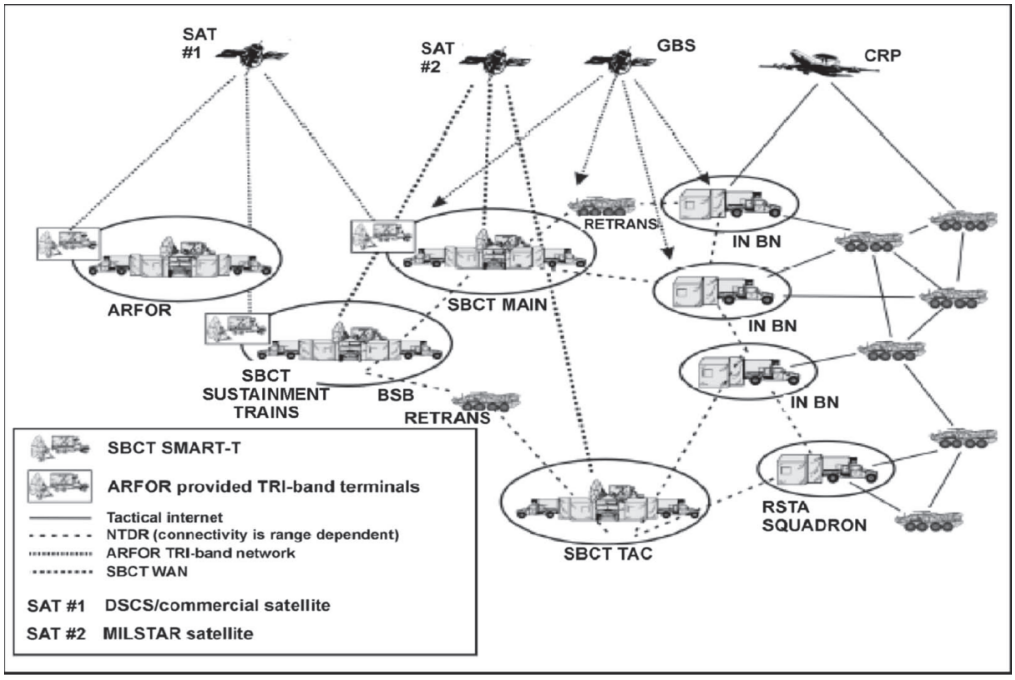

Figure 3-1. MI infrastructure

JOINT DATA NET

The JDN, also referred to as the multi-TADIL net (MTN), is used almost exclusively for distributing the air picture and MC data such as real-time tracks, unit status information, engagement status, and engagement operations orders among joint service systems and MC nodes. Until all participants have TADIL-J capability, non-TADIL-J units may enter the JDN using TADIL-A and TADIL-B. Figure 3-2 illustrates a typical JDN architecture, with primary and alternative links/paths.

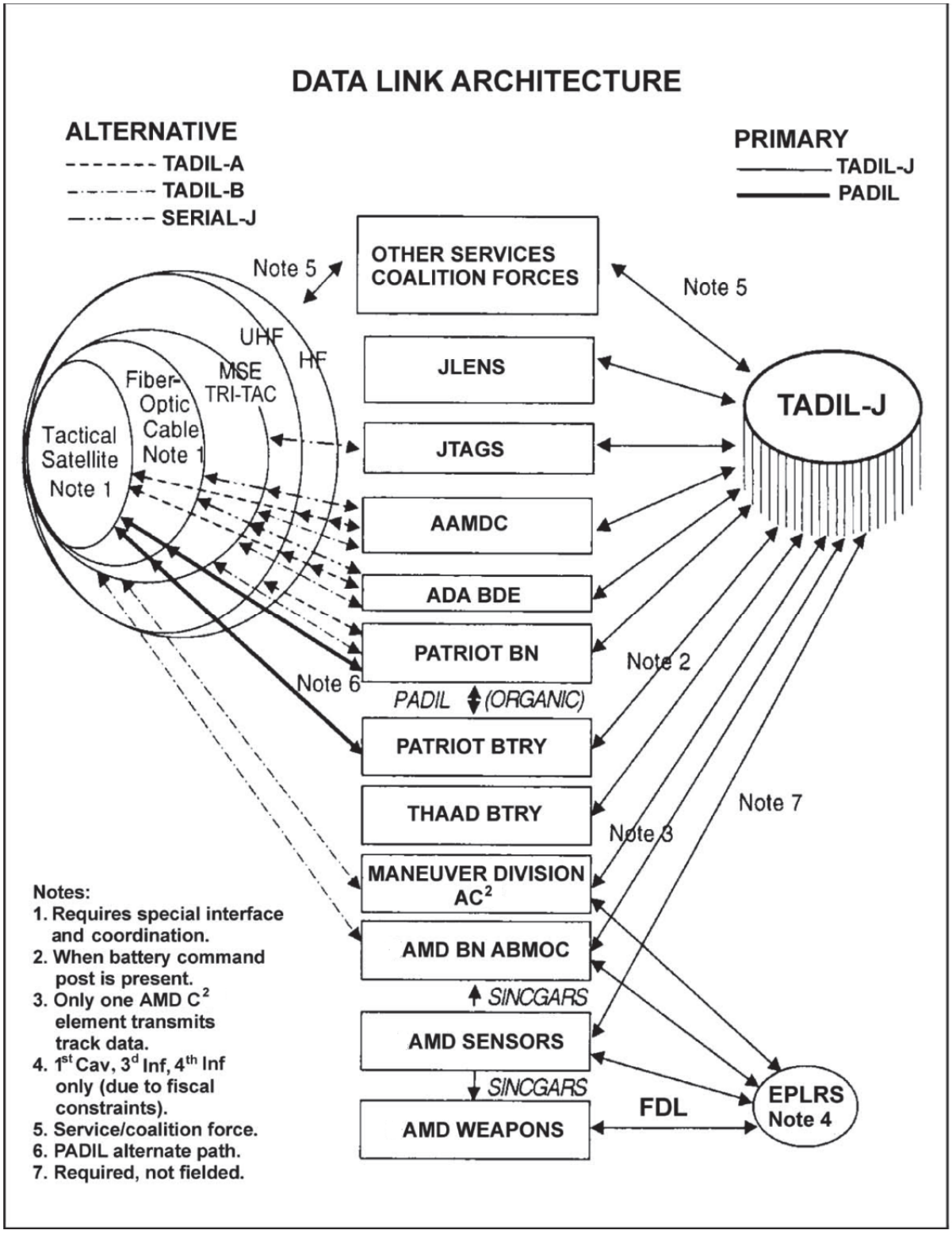

Figure 3-2. JDN architecture

3-11. The ADAM cell uses TADIL-J to exchange data over long haul media like the Area Common User System (ACUS), cable, or satellite. Currently, TADIL-J provides a limited capability for theater data

exchange until a JTIDS range extension capability becomes available. This capability will provide extended range connectivity between Army and joint units within a theater of operations. It will enable exchange of TADIL-J information at distances greater than 30 kilometers. In areas where mountains, vegetation, buildings, or other terrain features (natural or manmade) restrict the line of sight, TADIL-J will suffer accordingly. TADIL-A and TADIL-B links will remain to serve as back-up or secondary networks.

LINK-16

3-12. The Department of Defense (DoD) uses Link-16 as its primary tactical data link for command and control, intelligence, and, where practical, weapon system applications. It consists of a family of tactical data links deployed aboard a host of Army, Navy, and Air Force platforms. It supports TADIL J. Not all units have TADIL J capability and use TADIL A (Link-11), TADIL B (Link-11B), or TADIL C (Link-4A) to enter the network. Figure 3-3 illustrates the many tactical data links flowing into Link 16.

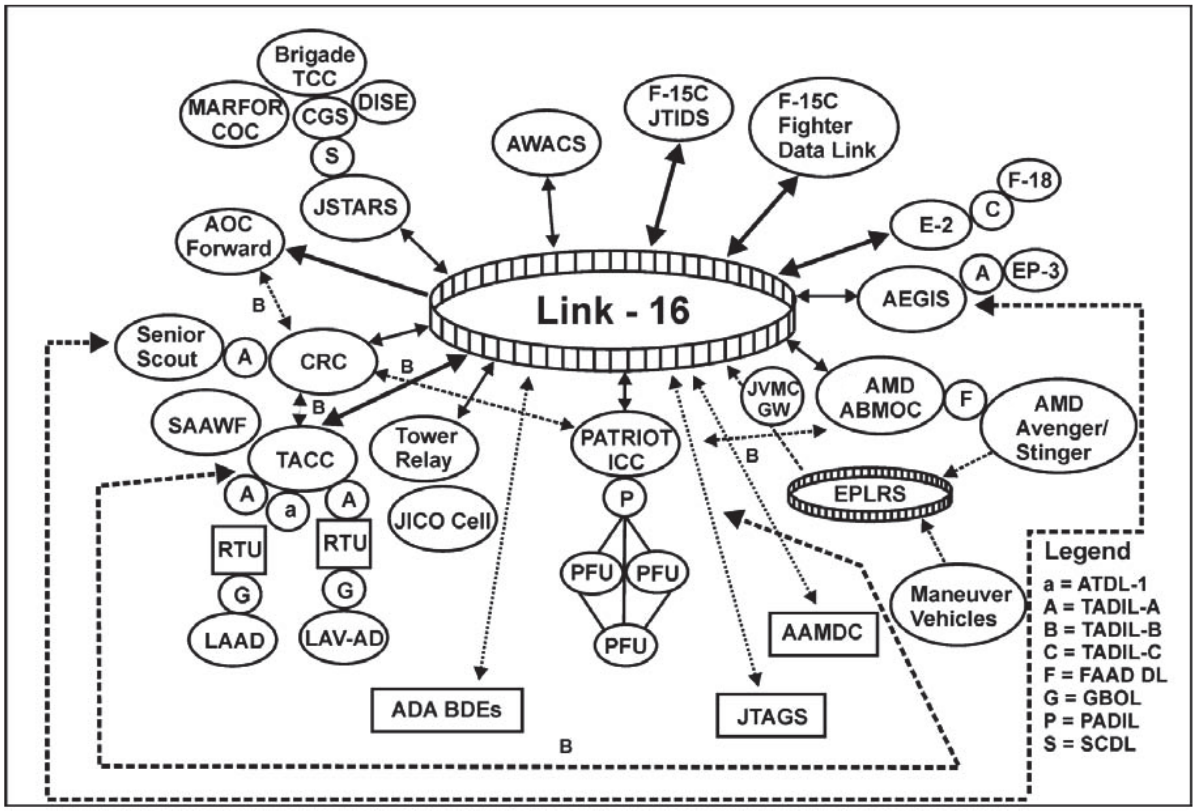

Figure 3-3. Link 16

OPERATIONS TASK LINK

3-13. The JICO, working for the joint force air component commander (JFACC)/AADC, develops the operational tasking data link (OPTASKLINK) based on the theater TADIL plan to support the AADC's surveillance and MC plans. The OPTASKLINK is the formal and executable portion of the joint integrated air defense system (JIADS) TADIL plan. See Figure 3-4.

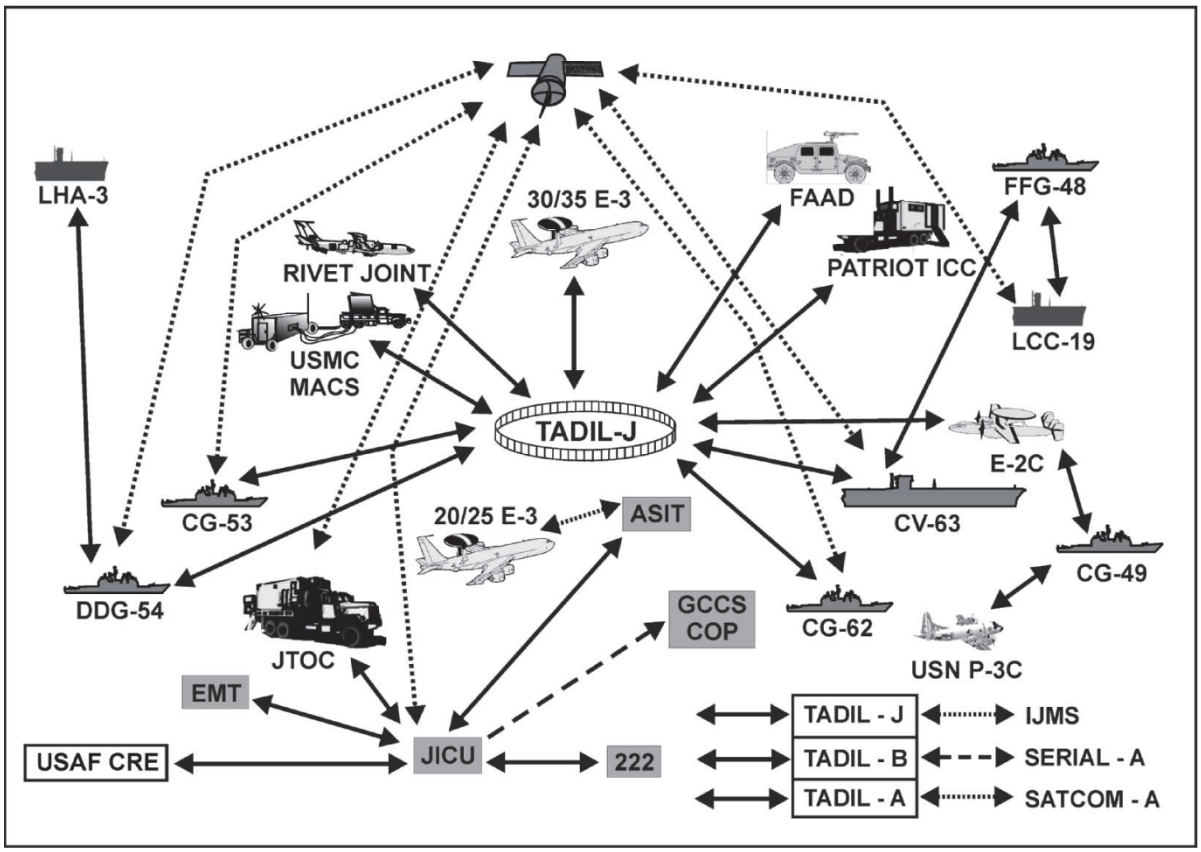

Figure 3-4. OPTASKLINK example

3-14. The OPTASKLINK provides the detailed instructions necessary to establish/initialize operational tactical data links and provides the means to change existing information as required. The OPTASKLINK covers NATO Links 1, 4 (TADIL C), 11 (TADIL A), 11B (TADIL B), 14, 16 (TADIL J) IJMS, and national links. ADTL-1 information can be included in one of the general text (GENTEXT) sets of the OPTASKLINK. Prior to deployment, coordination can be made to add the ADAM cell to the OPTASKLINK. This will save time once in theater. It will also allow the necessary equipment to have the right settings prior to establishing connectivity in the theater of operation.

3-15. The ADAM cell deploys with the BCT or with other divisional units that do not possess an organic air defense battalion. It conducts continuous air and missile defense planning and coordination, monitors aerial situational awareness within the BCT/assigned unit's AO, and performs AC2 with Army aviation assets. The ADAM cell has only AC2 capabilities and possesses no organic air defense weapon systems. Other air defense assets are task-organized based on the BCT or divisional unit's mission and potential threat. The ADAM cell integrates and provides data connectivity with the integrated air defense system (IADS) and establishes initial operational capability (see Tables 3-1).

Table 3-1. Army Unit Communications Capability Matrix

Interface Characteristics	AAMDC and ADA Brigades	Army Patriot Information Coordination Center (ICC)	Army Patriot Battery Command Post (BCP)	Air Defense Air Space Management (ADAM) Cell	ARMY Air Defense With FAAD C4I (Sentinel Radar)
1. Missions	Threat Detection and Warning SAM Control Air Defense Management Tracking Identification	Threat Detection Tracking Identification SAM Control Air Defense Management	Situational Awareness	Threat Detection and Warning Tracking Identification Air Defense Management	Threat Detection Tracking Dissemination Warning Cueing Air Battle Management
2. Technical Functions (Includes Mission Categories for Weapons Coordination and Management and Control)	PPLI Air Surveillance Weapons Coordination and Management Information Management Mission Management Point Surveillance	PPLI Air Surveillance Weapons Coordination and Management Information Management Point Surveillance	PPLI	PPLI Air Surveillance Weapons Coordination and Management Information Management Point Surveillance	PPLI Air Surveillance Weapons Coordination and Management Information Management Mission Management Point Surveillance
3. Types of Tracks Maintained and reported to interface	Air EW Points	Air EW Points		Air EW Points	Air
4. Interface data link capability/limitaticns	TDL B TDL J SERIAL J TDL A Army tactical data link 1 (ATDL1) FDL IJMS	TDL A TDL B TDL J ATDL1 PADIL IJMS	TDL J	TDL A TDL B TDL J FDL IJMS	TDL-J FDL TDL- B IJMS
5. Track position data base limits	Within 1024 data miles of the system coordinate center (SCC)	For unit locations: +/- 1,023.5 data miles from own SCC. The other track positional data +/- 511.75 data miles from own SCC.		Within 1,024 data miles of the SCC	410 KM
6. Maximum display area	1024 Data Miles	1,024 KM x 768 KM		1,024 Data Miles	400 KM x 400 KM
7. Data registration	Done automatically with respect to the DLRP.	Done automatically with respect to the DLRP.		Done automatically with respect to the DLRP.	Manual input to coordinate converting parameters.
8. Track number	OPTASKLINK	OPTASKLINK	OPTASKLINK	OPTASKLINK	OPTASKLINK

Table 3-1. Army Unit Communications Capability Matrix (continued)

9. Track Identification		Automatic (passive/active) Manually (passive/active)			Automatic with manual override adjustable parameters
10. Voice Communications requirements/capabilities	Air Defense Command and Control Net (ADCCN)/DCN/ track supervision network (TSN) SC TACSAT/UHF/HF	ADCCN/DCN/ TSN UHF**	ADCCN/DCN/ TSN	ADCCN/DCN/ TSN SC TACSAT/UHF	ADCCN/DCN/ TSN HF
11. Correlation	Automatic if within 5 data miles when in Auto Track Mode. No correlation done over joint interface.	Automatic (correlation block size is variable as a function of aircraft position).		Automatic if within 5 data miles when in Auto Track Mode. No correlation done over joint interface.	Automatic correlation from Sentinel Radar feed at Sensor C2 Node.

INTERNAL CONNECTIVITY

3-16. There is a great deal of internal connectivity required within the ADAM cell CPP. Dependent upon the external communications connectivity available, mission-dependent, the various items of equipment may be configured differently. Therefore, each piece will be shown and its purpose described. It is incumbent upon the systems integrator and his operators to establish the required connectivity. Figure 3-5 depicts the typical connectivity of the components within the ADAM cell CPP.

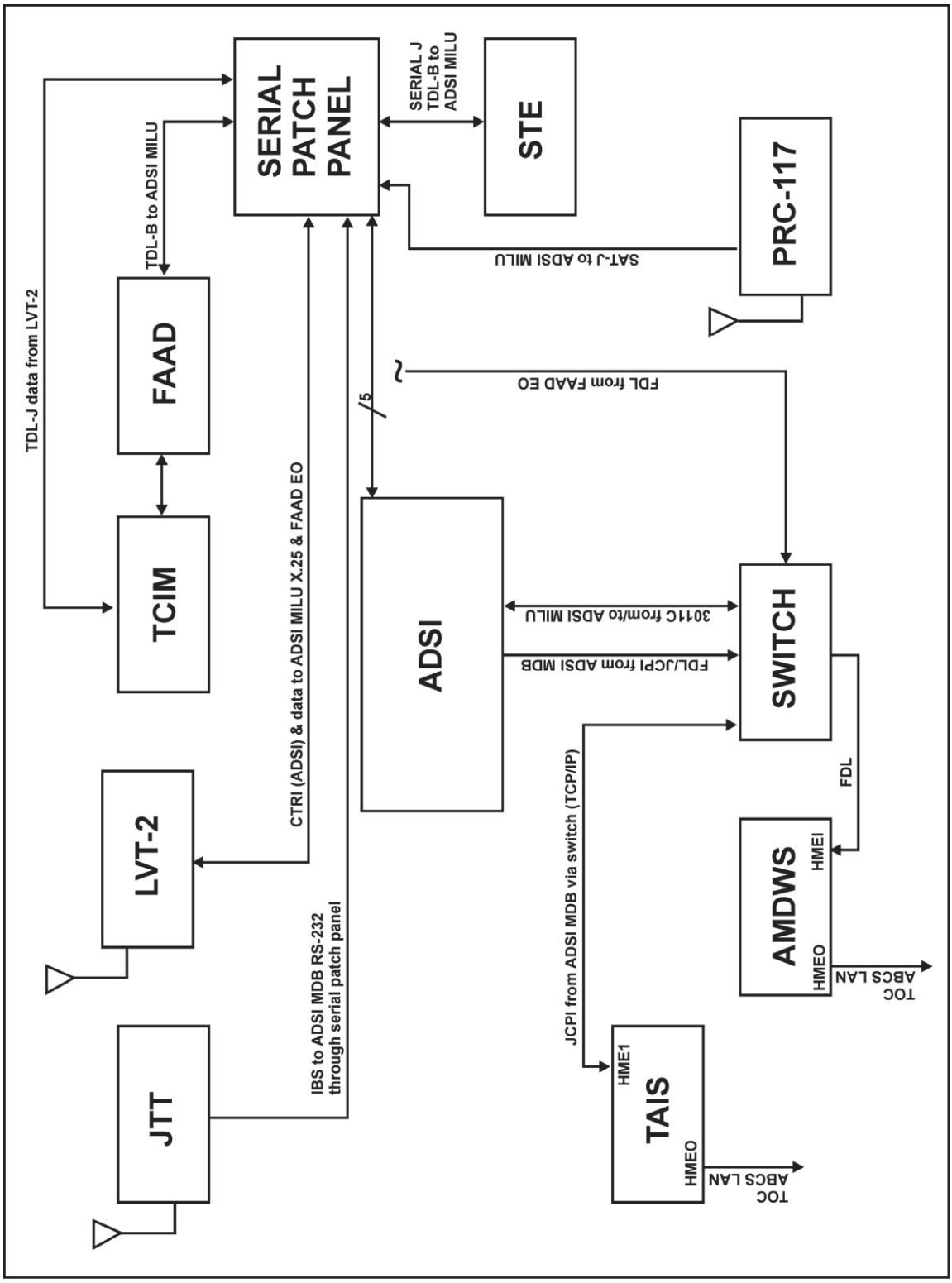

Figure 3-5. ADAM cell connectivity

3-17. LAN grid—The LAN grid is the nerve center of the ADAM cell shelter. It allows information to flow efficiently and securely though all systems in the network that require a Cat-5 cable hookup in the TOC. The six sextet RJ-45 boxes eliminate the need for long cabling throughout the shelter and increase the data flow. The LAN grid is depicted in Figure 3-6.

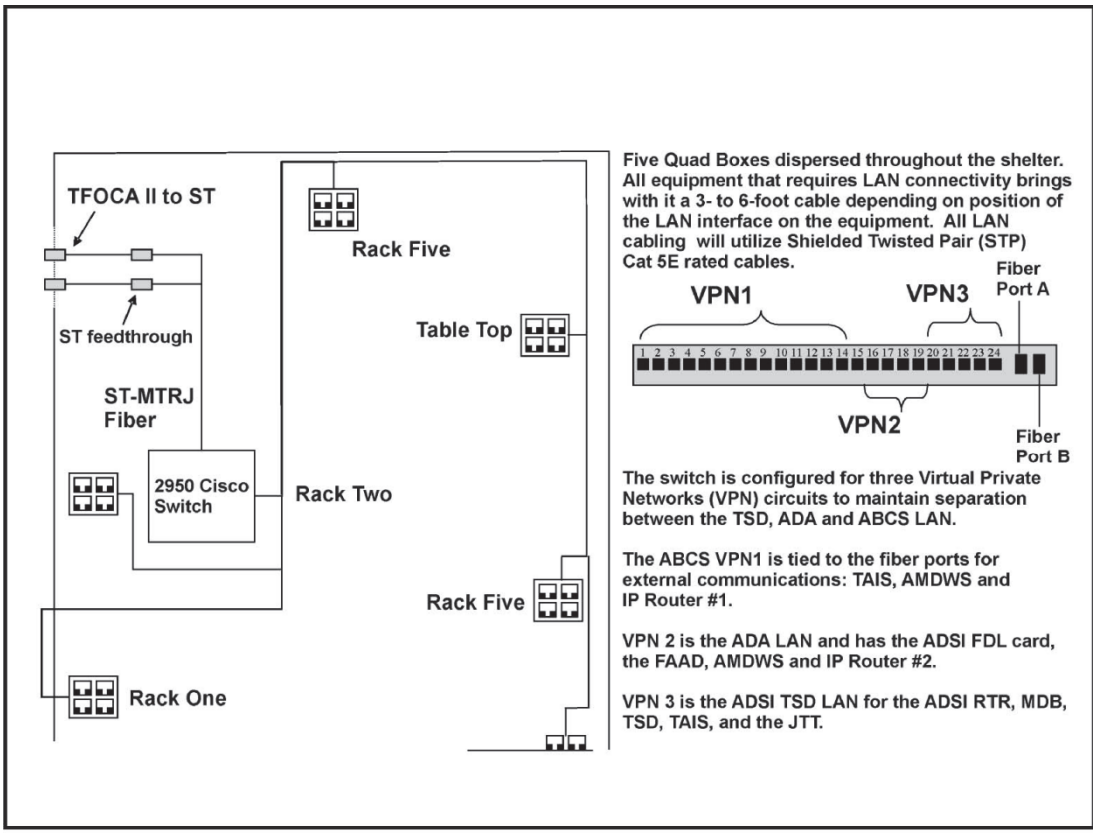

Figure 3-6. LAN grid

3-18. Intercom system—The intercom system routes the radio voice signals from all systems to a central control station. Intercom connections are depicted in Figure 3-7.

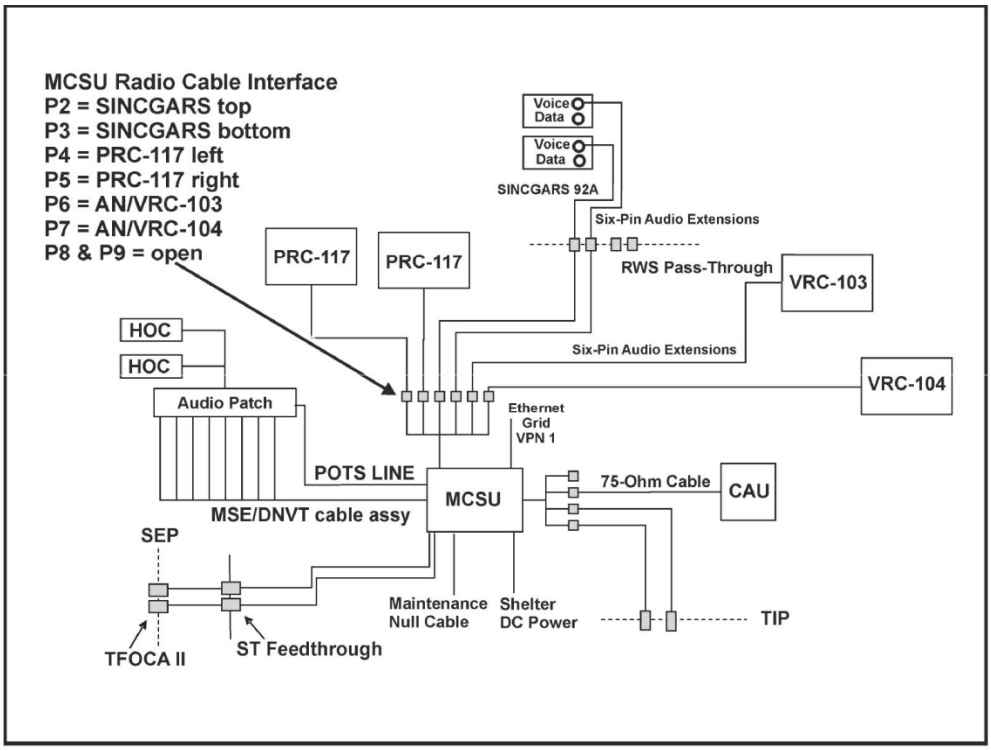

Figure 3-7. Intercom connection

3-19. FAAD C2I Integration—The forward area air defense command, control, and intelligence (FAAD C2I) system connections receive data from the various data systems and then dispatch them to the proper systems for relay and display. FAAD integration is depicted in Figure 3-8.

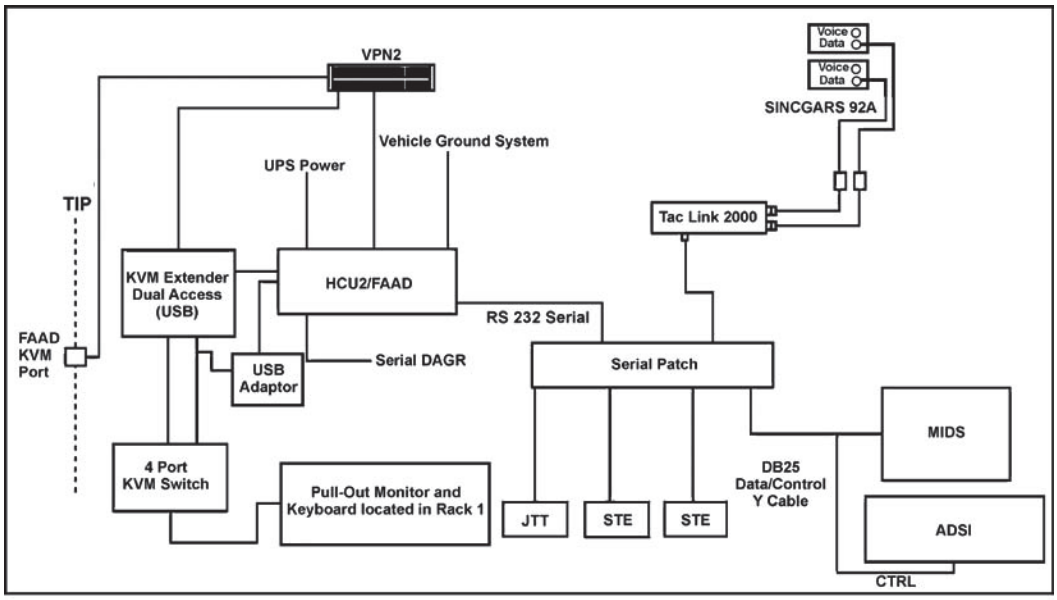

Figure 3-8. FAAD integration

3-20. TAC Link 2000 of the CPP shelter—The tactical communications interface modem (TCIM) provides the connection interface between the FAAD C2I and radio data systems. The TAC Link 2000 serves this purpose in the CPP shelters. The single TCIM interconnection is depicted in Figure 3-9. Dual TCIM interconnection is depicted in Figure 3-10.

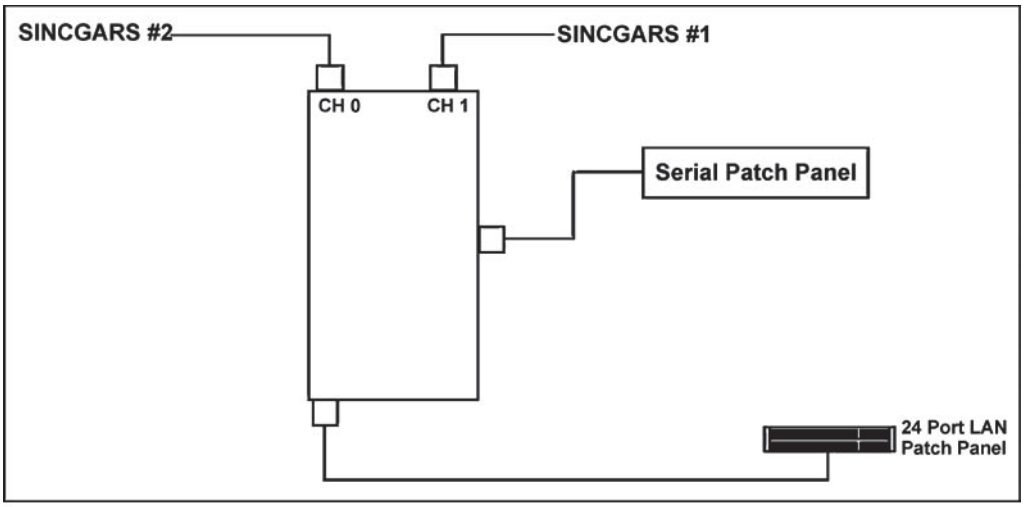

Figure 3-9. Single TCIM interconnection

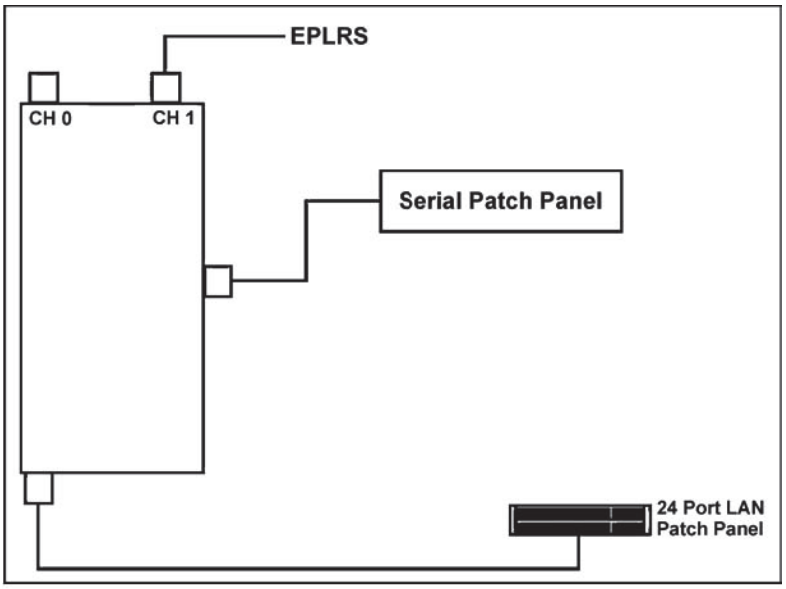

Figure 3-10. Dual TCIM interconnection

3-21. AMDWS of the CPP shelter—The air and missile defense workstation receives primary Air Breathing Track (ABT) and TBM data from the JTT, FAAD C2I and ADSI. It also connects to the ABCS systems by using the CAT-5 network. The CPP shelter changes the HCU2 for the Bullfrog Laptop. The AMDWS connection is depicted in Figure 3-11.

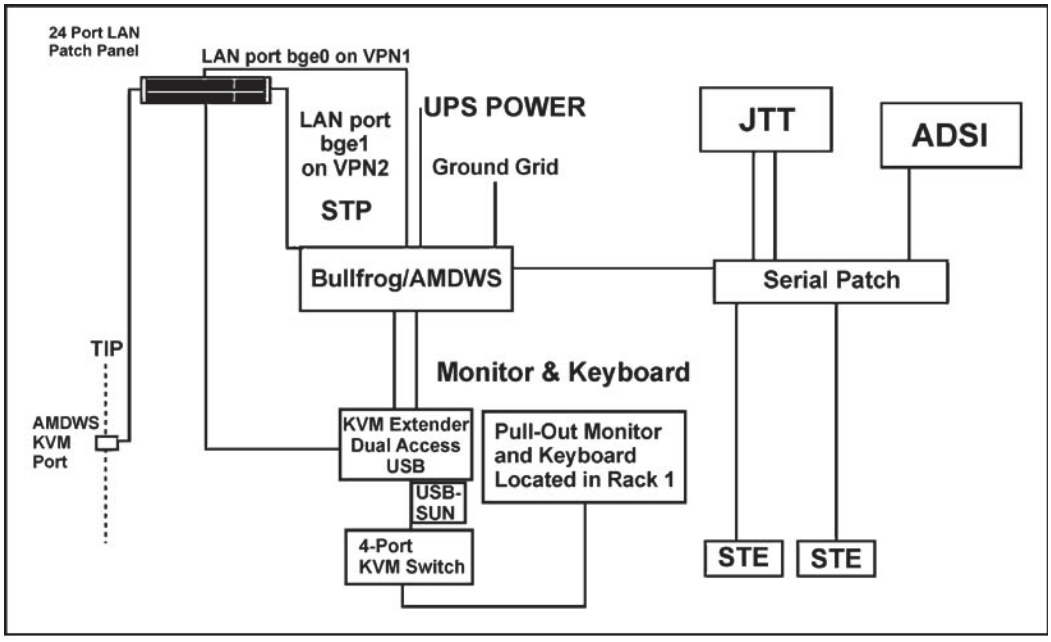

Figure 3-11. AMDWS connection

3-22. TAIS of the CPP shelter—The Tactical Airspace Integration System receives primary ABT data from the JTT and ADSI. The TAIS connection is depicted in Figure 3-12.

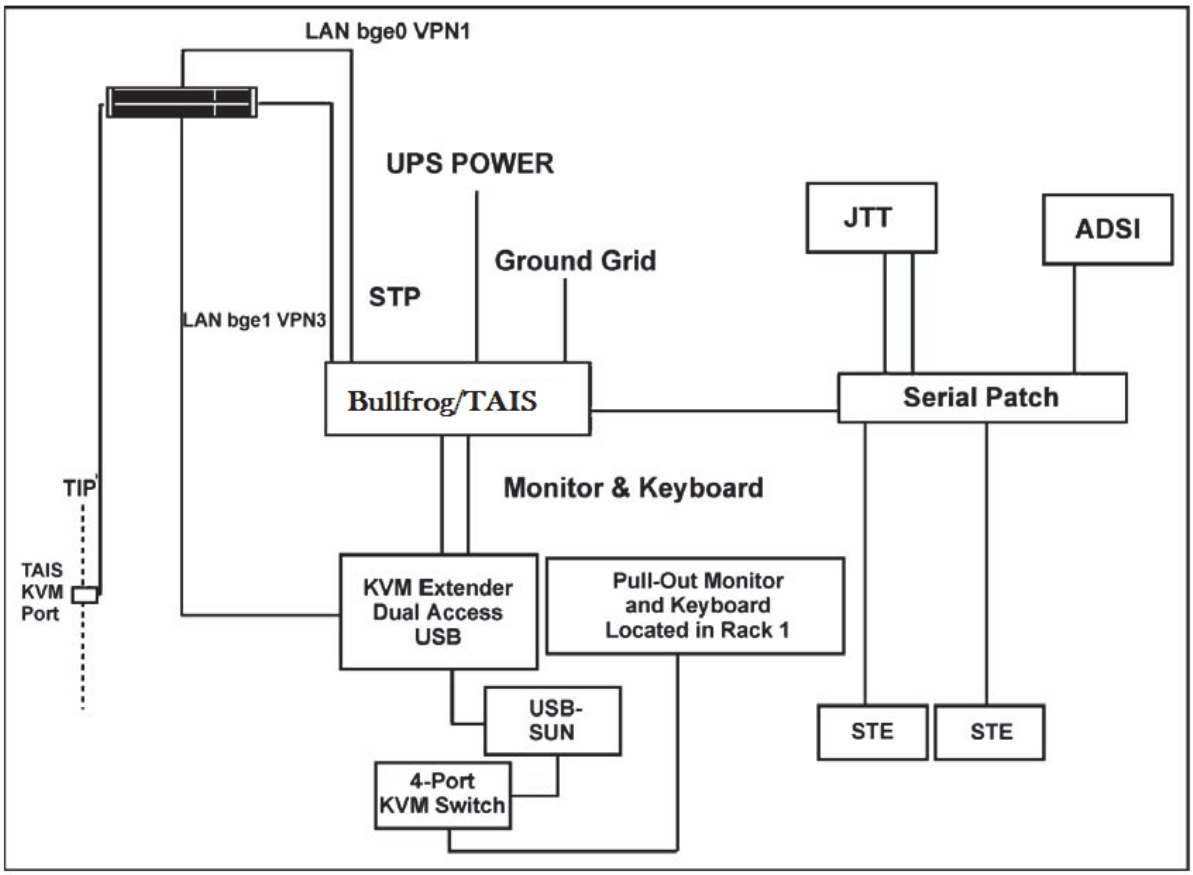

Figure 3-12. TAIS connection

3-23. ADSI—The ADSI connections provide for the reception of air track and missile data from the various data systems and then out from the ADSI to the proper systems for relay and display. The ADSI connection is depicted in Figure 3-13.

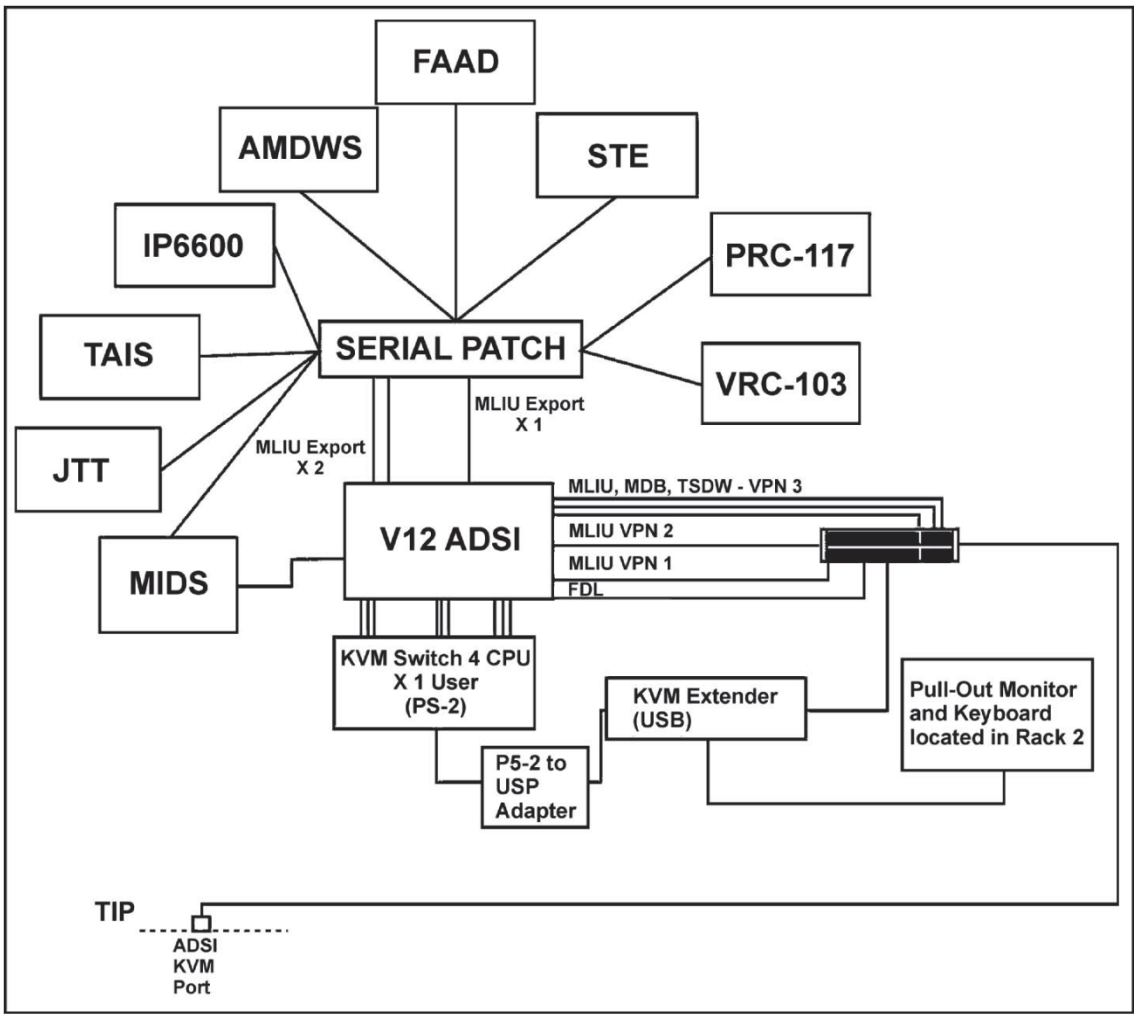

Figure 3-13. ADSI connection

3-24. AN/PRC-117F—The AN/PRC-117F (V) (C) transmits and receives voice and data in both LOS and SATCOM operations. The system provides for the reception of SAT-J and voice within the CPP ADAM cell. The PRC-117F is depicted in Figure 3-14.

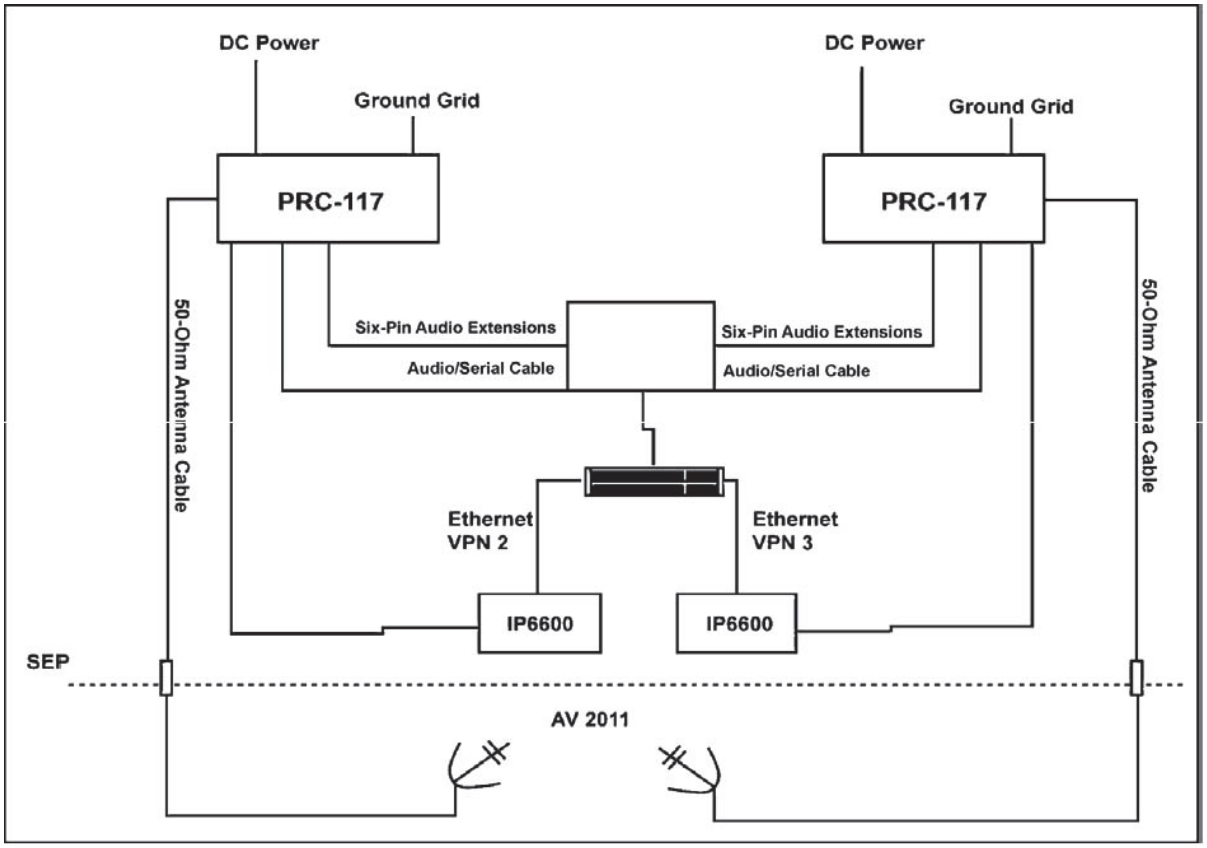

Figure 3-14. AN/PRC-117F

3-25. TIP—The shelter tent interface panel (TIP) connections allow for the connection of systems' remotes outside the RWS. The shelter TIP connection is depicted in Figure 3-15.

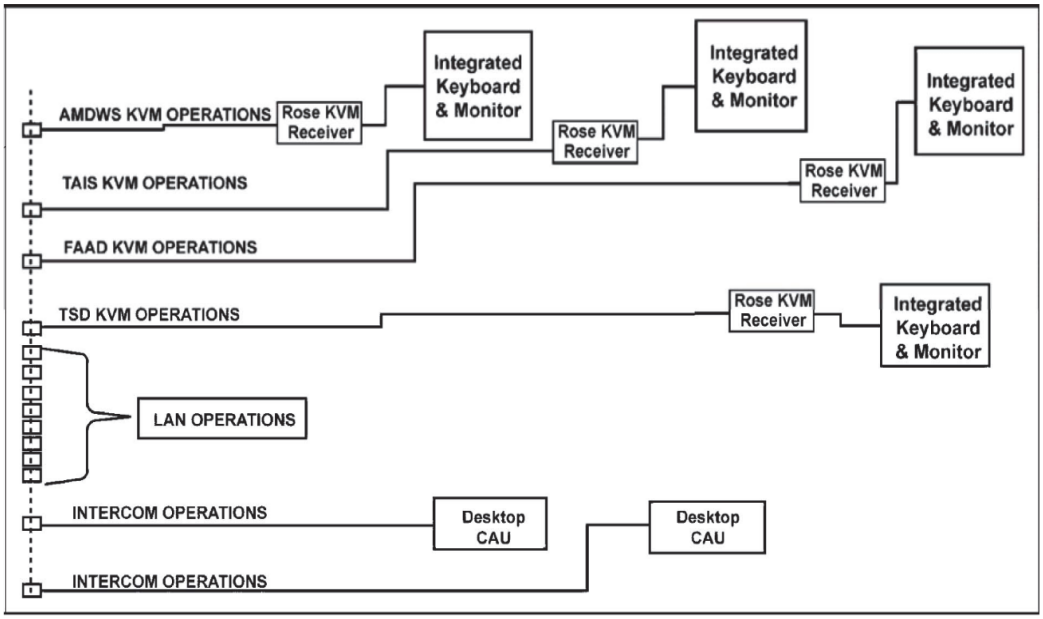

Figure 3-15. Shelter TIP connection

3-26. The AN/VRC-103(V)1 provides a vehicular mounting and power amplification option for the AN/PRC-117F(C). The AN/VRC-103(V)1connections are depicted in Figure 3-16.

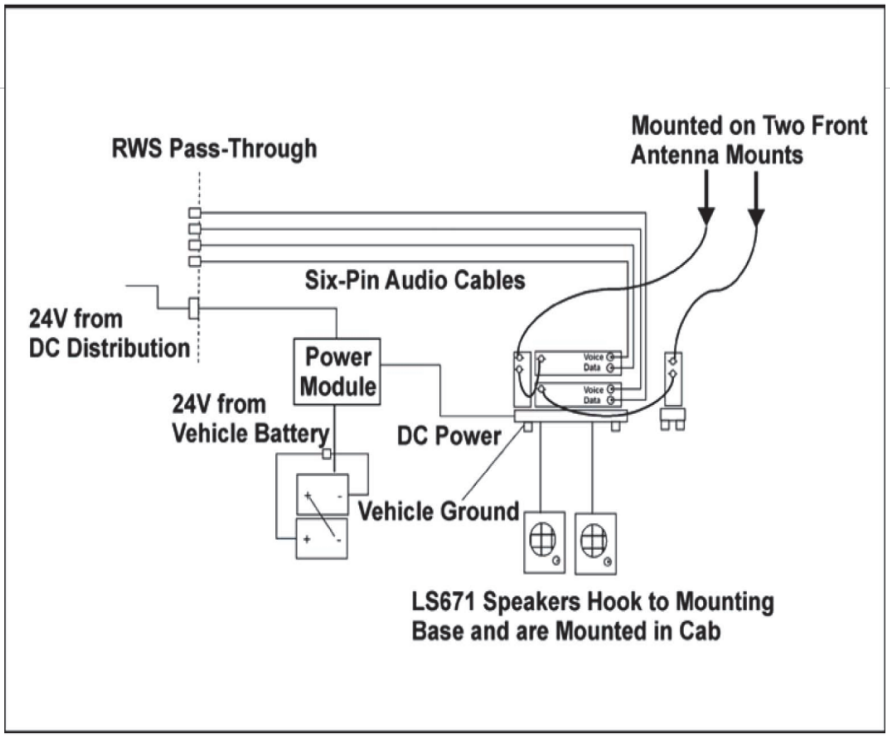

Figure 3-16. SINGARS connection

3-27. AN/VRC-103 and -104—The AN/VRC-103 and -104 transmit and receive voice in both LOS and SATCOM operations. The AN/VRC-103 and -104 connections are depicted in Figure 3-17.

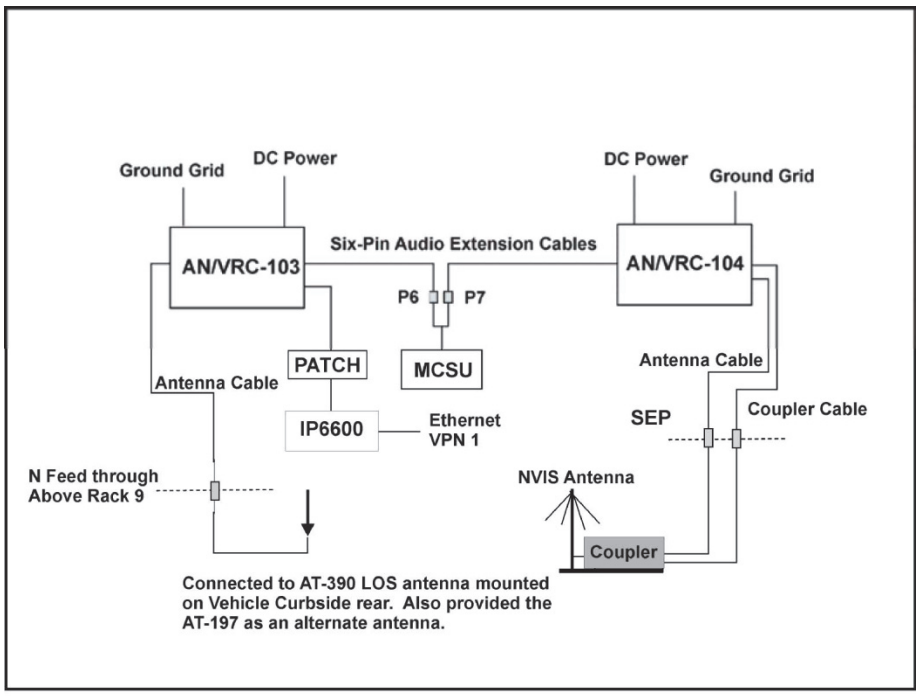

Figure 3-17. AN/VRC-103 and -104 connections

3-28. JTT—The joint tactical terminals provide near-real-time tactical intelligence and targeting information. The JTT connection is depicted in Figure 3-18.

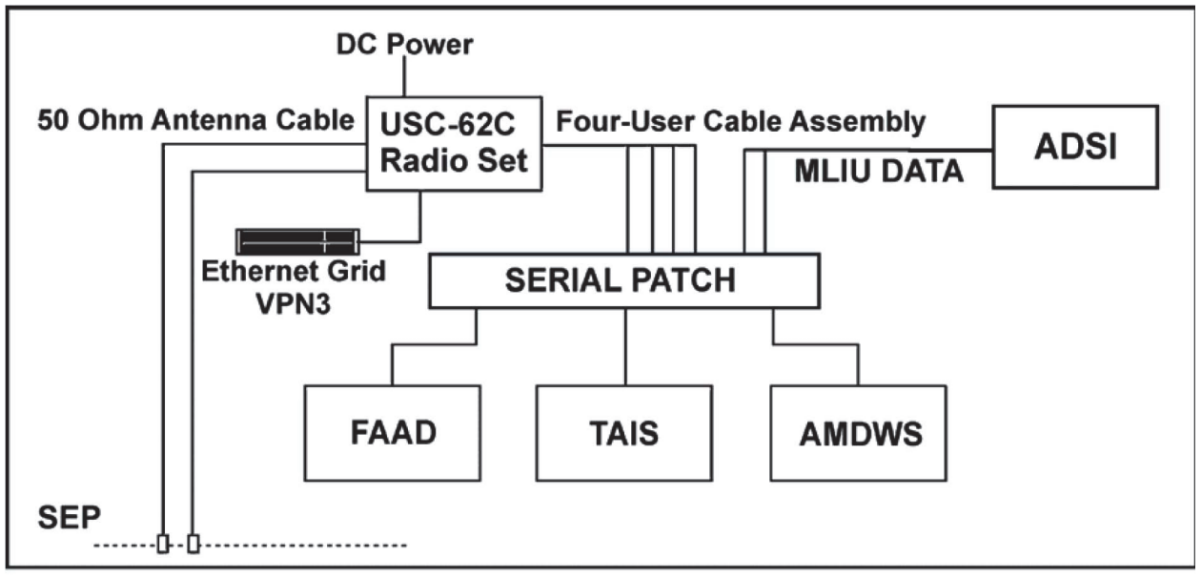

Figure 3-18. JTT connection

MESSAGES

3-29. The ABCS workstations within all TOCs exchange either United States message text format (USMTF) or variable message format (VMF) message formats. These formats show which messages go to whom, who transmits, and who receives. Refer to FM 3-52.

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Chapter 4
OPERATIONS

This chapter provides a brief overview of the organization, roles, responsibilities, and techniques for conducting effective and efficient operations in an ADAM cell. The digital systems roles and recommended procedures within the ADAM cell and the Army Battle Command System are discussed. Also discussed are the recommended procedures and operational process for the common operational picture. Specific ADAM cell staff tasks are detailed, and system initialization, describing how the user initializes each system safely.

ARMY BATTLE COMMAND SYSTEM

4-1. The United States Army Air Defense Artillery School (USAADASCH) is making rapid and drastic changes in ADAM cell design by taking full advantage of the newest computer technology. The ADAM cells are for digitized units and are small, mobile, deployable, and equipped to access, process, and distribute the information and orders necessary for their echelon. This chapter outlines the internal operations of an ADAM cell at whatever echelon that it may be used. The ADAM cell is a digitized CP with a specific mission and concept of operation.

DATA EXCHANGE

4-2. Central to ADAM cell operations is the manner in which it exchanges data. The ABCS in the ADAM cell share information either directly with one another or through the joint common database (JCDB). The JCDB resides on all the ABCS computers in the ADAM cell and provides the data for the common applications that generate the COP. Battlefield information dynamically flows back and forth between the ABCS and the JCDB. When data is entered through a Battlefield Automated System (BAS), this change is forwarded to all ABCS subscribers on the TOC tactical LAN (TACLAN) and posted to the COP (see Figure 4-1).

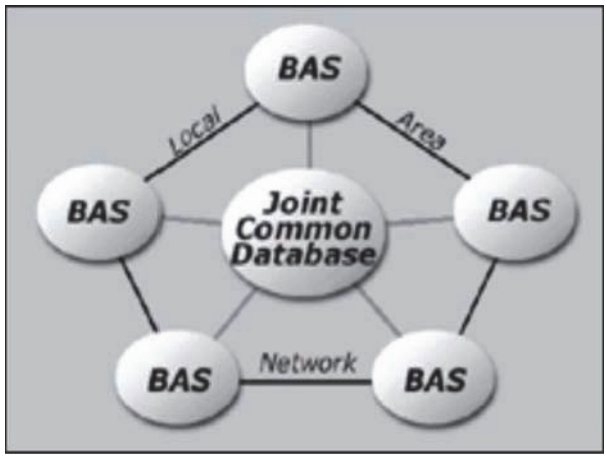

Figure 4-1. Data exchange within a CP LAN

4-3. Data is also exchanged between other units/elements via the JDN. This allows the same data to be maintained in the JCDBs in the AO. Data generated by each BAS flows to its counterpart BAS at adjacent

echelons. Each BAS then transfers this information to the JCDB at that echelon via the tactical Internet (TI). Friendly or "blue" picture position information flows from FBCB2 upward through the Embedded Battle Command (EBC) on the server located at each echelon. This information is then deposited into that echelon's JCDB. This data exchange ensures all TOCs have JCDBs resembling one another. This is key to creating the COP.

4-4. Figure 4-2 shows this data flow between an example battalion and brigade with their MCSs operating as servers. Note the flow of friendly position information (depicted by dashed arrows) moving between EBC at these echelons and into their respective JCDBs. Each BAS can, in turn, access this friendly picture from the JCDB at its echelon. The flow of data from a BAS to other BASs and the JCDB is shown by solid arrows.

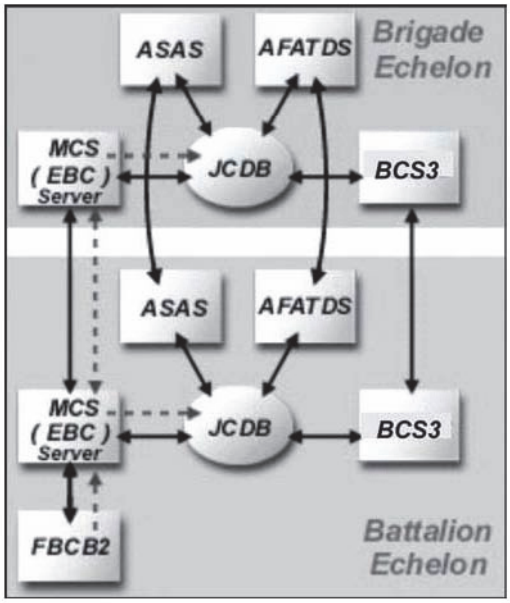

Figure 4-2. Data exchange between CPs

Therefore, the place where battlefield vision is best supported. The commander uses the combat information center (CIC) to illustrate his guidance and, with his staff's assistance, to develop and maintain the COP.

4-5. The large screen display (LSD) is a portable projection system using Triple Super Twisted Nematic technology to display up to 24,389 color pixels at 1024 x 768 resolution. Power is provided for 100/240 VAC and is adaptable to tactical vehicle power sources. The LSD has on-screen set-up menu displays, rear projection mode, and remote control capability. The resident 400-watt quartz halogen lamp uses 15-foot diagonal images to accommodate large target audiences.

4-6. CICs will vary by unit modified table of organization and equipment (MTOE). However, the typical CIC has two LSDs, each capable of displaying nine sub screens. Each sub screen can display the COP and can be configured in various ways to best support the commander's information display preferences. The more sub screens used, the lower the resolution of the image. It is, therefore, recommended that each LSD screen use no more than four sub screens. With two LSDs, this allows the display of eight sub-screens which should ordinarily be sufficient. The addition of the engineer battalion LSD will increase this display capability.

CIC Data Display Management

4-7. Information management (IM) plays a key role in a commander and staff's ability to maintain an accurate picture of the battlefield in the CIC. With feeds from each ABCS, the CIC's LSD enables them to see more of the battlefield and to receive greater amounts of real-time battlefield information by WFF than is currently available with analog systems. More information is not necessarily beneficial to mission planning and accomplishment. Data must be filtered, fused, and focused to create meaningful informational displays relevant to the commander's mission. These displays or tactical pictures must, therefore, be presented in a logical manner on the LSD to support situation understanding (SU).

4-8. CP digitization has caused analog maps, acetate, and wing-boards to be replaced with digital overlays and electronic files. Because electronically stored information is readily available through a minimum number of computer keystrokes, there is also less need to actually print paper copies of the information. However, information saved electronically has a tendency to be "out of sight, out of mind." Leaders and staff must, therefore, know what data is available to them to make conscious decisions as to what will be displayed.

4-9. Though the LSD has the capability of displaying any BAS' electronic data, the narrative and static aspects of some information still lends itself to paper copy posting within the CP. This is especially true for information that is less likely to change during a mission such as CCIRs and the synchronization matrix. In turn, this optimizes the use of LSD sub screens by freeing them to depict dynamic ABCS digital content.

4-10. The commander, executive officer (XO)/operation staff officer (S-3), and battle captain must be able to orchestrate war fighting function (WFF) coordination through the display of key information on the LSD. Each staff section must, therefore, maintain information relating to its WFF using visual graphics that support the COP. To facilitate information control and display, staff sections and their supporting systems should be arranged around the LSD to facilitate staff interaction, coordination, and information analysis. The COP is displayed on the LSD through one ABCS, typically the S-3's MCS or MCS-light. COP control and manipulation and CP LAN administration are aided by centrally collocating the CP server and the BAS that projects the COP. The ability to view the LSD through the BAS controlling the COP also facilitates communication and navigation through data. During discussions in the CIC, personnel can focus staff on key portions of the COP either verbally or with a laser pointer.

4-11. Data will be displayed on the LSD via the COP using the ABCS COP application or through overlays provided by individual BASs. To portray the COP graphically requires METT-TC analysis of information. The COP displays enemy (shown as red feed and graphics), friendly (shown as blue feed and graphics), terrain (shown as characteristics and impact), and civilian considerations (shown as gray feed and graphics). Friendly analysis occurs in the CIC by all WFF sections and systems. Each BAS provides operational overlays for subsequent data manipulation and consolidated viewing in the form of operational pictures that form the COP. Enemy analysis is especially time-sensitive information. This demands readily available ASAS and tactical unmanned aircraft systems (TUAS) that are protected from CP traffic flow.

4-12. The MCS whiteboard or electronic whiteboard (also known as "Show me") equips leaders and staffs with the capability to conduct collaborative sessions. Participants at distributed locations view the same enemy and friendly COP on an MCS display and are linked with audio. The "telestration" feature of the whiteboard allows each participant to use a mouse with a crayon drawing capability to visually depict locations, graphics, and other coordination measures that can be seen on the participants' screens.

Digital Running Estimates

4-13. Not all key information can be graphically depicted on the LSD. Such information must, therefore, be captured in a readily available, continuously updateable format for quick dissemination and assimilation. ADP 5-0 emphasizes that each staff section should maintain a running estimate (in narrative form at division and higher, in graphical form at brigade and battalion). In the analog CP, these graphical running estimates correspond to wing board and map data. Digitization has eliminated the need to post information to wing boards but has created the need to organize digital data. Units must capitalize on the TACLAN web pages maintained by each staff section for organizing and posting critical mission data. By placing digital running estimates on a web page, each staff section supports the commander's and staff's

need to quickly review, update, and use information for battle monitoring and planning. Establishing a standard running estimate format facilitates navigation through the estimate and cross-referencing between estimates. Running estimates should also list available operational overlays by name to better focus graphical review within the ABCS COP application and to focus all echelons and staff on the same, most current data. Through digitally-equipped LNOs, analog units should access these digital estimates to obtain current operational data and to help synchronize their operations with digital units.

INFORMATION MANAGEMENT

4-14. The staff must be organized to support the information management process of filter-fuse-focus. This process will be guided by doctrine; tactics, techniques, and procedures (TTPs); and unit SOPs. The staff must operate according to established procedures that specify access to common databases, common displays, and report formats. The staff must be organized to allow the vertical and horizontal flow of information. This organization should provide links between teams within staff sections, between staff sections within a CP, and between CPs at the same, higher, and lower echelons.

4-15. Digitization enables commanders and staff to focus more on the execution of combat operations and much less on planning, coordination, and the processing of information. Commanders and staff will have much more data upon which to base their decisions. Their challenge, therefore, will be to manage the flow of vast amounts of data so that the right information gets to the right person at the right time. These specific challenges are—

- Relevancy. Determine the relevant information from among the vast amount of data available.
- Responsibility. Ensure that each product is the assigned responsibility of a specific staff section.
- Accuracy and Currency. Ensure that the data is correct and up-to-date.
- Dissemination. Ensure that information generated by the staff gets to the right personnel.
- Evaluation. Ensure that information is appropriately assessed.

Relevancy

4-16. Because of the large quantity of data available, it is especially important for the commander to establish information priorities to focus the staff during their data collection. These priorities must address the relevant information to the specific operation. The commander provides this focus via CCIRs which are—

- Specified by the commander and applicable only to him.
- Situation-dependent and linked to present and future operations.
- Based on events or activities that are predictable.
- Time-sensitive (answers to CCIRs must be reported to the commander by the most rapid and effective means).

4-17. Table 4-1 summarizes the CCIR responsibilities.

Table 4-1. CCIR Responsibilities

Commander	• Establish CCIRs. • Establish priorities for information collection and distribution. • Assign assets to collect information. • Determine display of information throughout command during an operation.
Chief of Staff/ Executive Officer	• Manage CCIRs. • Establish TTPs for tracking when and how CCIRs are answered. • Assign responsibility to personnel within staff sections and CPs to manage information. • Supervise commander's guidance for collecting, processing, and circulating information.
Staff Leaders	• Manage information within BAS. • Recommend CCIRs based on analyses. • Record, evaluate, analyze and report collected information to answer CCIRs.
Staff Section Operators	• Monitor ABCS traffic. • Know what to file, what data to display, what to name/rename files, and where to store them. • Know what graphics to display. • Be alert to CCIRs and know how to act on them.

Responsibility

4-18. The diverse products produced using ABCS must each be the responsibility of specific staff sections. This responsibility will usually be obvious, being based on doctrine. Unit SOPs/TTPs must confirm these doctrinal responsibilities while ensuring that all other products are the assigned responsibilities of specific staff sections. Table 4-2 lists typical products and tasks which the ABCS tools typically use to produce them, and the staff section responsible for them.

Table 4-2. Staff Products, Responsibilities, and ABCS Tools

Staff Section	*Product/Task*	*ABCS Tool(s)*
All/Misc Sections	CCIRs	Office products/file sharing/MCS plans manager
	Order/Plan Annexes	COP plan/office products/MCS maps and overlays
G-3/S-3	Timelines for Producing Orders and Plans	MS Office products/FTP
	Plans/Orders	Common message processor (CMP)/MS Office products/file sharing/COP Plan/OPLAN/OPORD tool
	Specified, Implied, & Essential Tasks	Derived from higher orders/plans and posted via MCS to homepage
	Higher Headquarters Graphics	Via MCS or COP/COP plan/web page
	SOPs of higher headquarters	MS Office products/FTP
	Commander's and Operations Estimates	Running Estimate Template in MS Office products
	Time-Phased Force Deployment Data	GCCS-A commander's force analyzer
	Current/Planned UTOs	UTO tool
	Commander's Guidance	MS Office products, COP
	Area of Operations	COP operational overlays/maps and overlays
	Airspace Control Measures	TAIS
	Airspace Deconfliction	TAIS
	Air Traffic Services	TAIS
	Relative Combat Power	MCS COA tool—force ratio calculator
	Operational Environment Overlay	COP operational overlays/maps and overlays
	Time-Space Analysis	MCS distance rate tool
	Wargaming	DaVinci tool/COP plan/COP/CMP/MCS COA tools
	Courses of Action	COP operational overlays & SU/BCS^3 web page/MCS plan manager/force ratio calculator/DaVinci/MS Office products
	Synch Matrix	MCS synch matrix
	Decision Support Template	MS Office products
	COA Decision Matrix	MS Office products/MCS plan manager

Table 4-2. Staff Products, Responsibilities, and ABCS Tools (continued)

Staff Section	*Product/Task*	*ABCS Tool(s)*
G-2/S-2	Intelligence Estimate	Running estimate template in MS Office products
	Obtain Higher Intelligence Products	Downloaded from higher headquarters' websites and shared folders
	Distribute Higher Intelligence Products	Post to unit websites and shared folders and/or send to users
	Request for Information (RFI)	CMP/COP/COP Plan/MS Office products/ASAS reachback capability
	ISR Plan	DTSS products/COP operational overlays/COP plan/MS Office products/BCS^3 web page/CMP/file sharing
	Alerts	Enemy target alerts via ASAS
	Automated Targeting	Target nomination via ASAS
	Enemy Situation	ASAS enemy SITTEMP
	Modified Combined Obstacle Overlay (MCOO)	COP plan/operational overlays/MCS maps and overlays
	Area of Interest	COP operational overlays
	Order of Battle Files, Threat Records, and Threat Models	COP operational overlays, COP plan, MS Office products, ASAS-RWS
	Threat Doctrinal Template	COP operational overlays
	Threat Capabilities Overlay	COP operational overlays/MS Office products/Word templates/CMP
	High-Value Target List	COP plan/COP
	Prioritized Threat COA Lists	COP/MS Office products
	Event Template Overlay	COP/MS Office products
	Event Matrix	MS Office products
	PIR	COP/COP plan/MS Office products
	SIR	COP/MS Office products
G-1/S-1	Personnel Daily Summary	BCS^3 web page
	Personnel Estimate	Running estimate template in MS Office products
G-4/S-4	Logistics Estimate	Running estimate template in MS Office products
	Materiel Status	BCS^3 web page
	Unit Status	BCS^3 web page
	Supply Class Report	BCS^3 web page
	Capability Report	BCS^3 web page
	Supporting Assets Status	BCS^3 web page
	Wargaming	BCS^3 COA tool
	Resource Requirements Forecasts	GCCS-A logistics analyzer
	Logistical Support Plan	COP/MS Office products
	Sustainment Overlay	MS Office products/COP/COP plan

Table 4-2. Staff Products, Responsibilities, and ABCS Tools (continued)

Staff Section	*Product/Task*	*ABCS Tool(s)*
FSC	Fire Support Analysis	COP operational overlays/DTSS overlay
	Artillery Dead Space Overlay	COP tools > terrain analysis > indirect fire weapons
	Wargaming	AFATDS COA tool
	Weapon-Target Pairing	Automated engagement recommendation via AFATDS
	Fire Missions	CMP with MCS, BCS[3], AMDWS, and FBCB[2]
	Fire Mission Results	CMP with ASAS
	Engagement Guidance and Prioritization	AFATDS target management matrix
	Fire Support Planning	AFATDS decision aids and analytical tools
	Fire Support Overlay	Office products/COP/COP plan
SWO	Weather Data Integration	Multisource weather data access via IMETS
	Battlefield Forecasting Model Products	IMETS
	Severe Weather Warnings	CMP via USMTF
	Weather Effects Overlay	IMETS IWEDA tool
Other Special Staff	Respective estimates on designated web page and/or shared folders	Running estimate template in MS/Star Office products

Accuracy and Currency

4-19. Because ABCS is automated, it allows information to flow much more quickly and accurately. However, while ABCS may be automated, not all of its information flows automatically. In fact, most of it does not. Only friendly position data (which supports the friendly or "blue" picture) flows automatically via EPLRS and EBC without action by operators. For all other data to enter and flow throughout ABCS each BAS must be properly initialized and its data maintained.

4-20. Staff sections will have ready and routine access to the many products of other staffs and units at varied echelons. This outside access may take place without a staff section even knowing about it. It is, therefore, incumbent on staffs to ensure they continuously post their most up-to-date products and maintain them on staff web pages and/or shared folders. CP internal procedures must likewise specify routines and suspense's for producing and revising ABCS products and where they will be maintained.

Dissemination

4-21. Due to bandwidth limitations, it might not be possible to routinely send out products through e-mail. On the other hand, it is insufficient to merely post information to a web site or shared folder and expect others to use it. With the exception of routine, scheduled postings/updates, staff must, therefore, proactively notify users when such changes are made. When a product is posted or revised, staff sections must notify other staff sections/units at the same, lower, and higher echelons. This notification must include instructions on precisely where to find the product and its file name. This will require units to establish SOPs that specify file naming conventions and file management procedures.

4-22. Whether forwarding products or providing notification of product postings in shared files/web pages, it is absolutely essential that the right personnel receive the right information. Correct address information using the ABCS address books and message handling tables (MHTs) must be established to ensure that data will be sent to the correct BASs. Addressees must be the users employing the individual ABCS rather than generic role names in the address book. If this is not done correctly, information on one BAS will not

flow to other BASs even in the same TOC. During initialization, operators must also create and distribute databases which can be done via messages in the current version of ABCS. This will ensure that BASs are able to share the right kind of information.

Evaluation

4-23. There is a tendency to accept computer data at absolute face value because it is computer-based and therefore assumed to be always correct. Users of digital systems must resist this tendency. Errors can be introduced through failures in BASs, databases, and communications systems; or human error in inputting data, failing to update information in a timely manner, et cetera. Data must therefore be evaluated within the context provided by SU to verify that it is accurate and current. Users must follow up discrepancies to ensure they have the right information.

MANAGEMENT OF DIGITAL CP PERSONNEL

BATTLE ROSTERS

4-24. Each section within the CP must maintain a battle roster listing the section operators assigned to each BAS. At a minimum, sections should plan for three operators per system: two Soldiers to man a 12-hour shift each plus one Soldier to serve as a backup and to provide periodic relief. The roster should list the following:

- Personnel name and rank.
- Assigned BAS.
- Assigned shift.
- Date of most recent training on system.
- Software version of most recent training.
- Estimated date of departure from unit.

4-25. Operators should be managed in a manner similar to unit vehicle drivers according to the following principles:

- Depth: Have more trained operators than needed to ensure BAS coverage even when unanticipated losses occur.
- Anticipate: Know when personnel are scheduled to depart the unit and train their replacements well in advance.
- Leaders: Section leaders should be prepared to function as operators; in addition to providing additional coverage, this will enable section leaders to better supervise and employ the BASs they oversee.
- Currency: Operators must be trained on the most current software carried on their BAS.

SHIFT MANAGEMENT

4-26. Shift changes are usually scheduled at 12-hour intervals. Commanders should consider offsetting shift changes at mid-shift for key personnel. Staggering personnel in this manner will maintain a constant interface of new and old shift personnel. This will ensure that at least one individual knows what happened during the previous shift. Figure 4-4 provides an example.

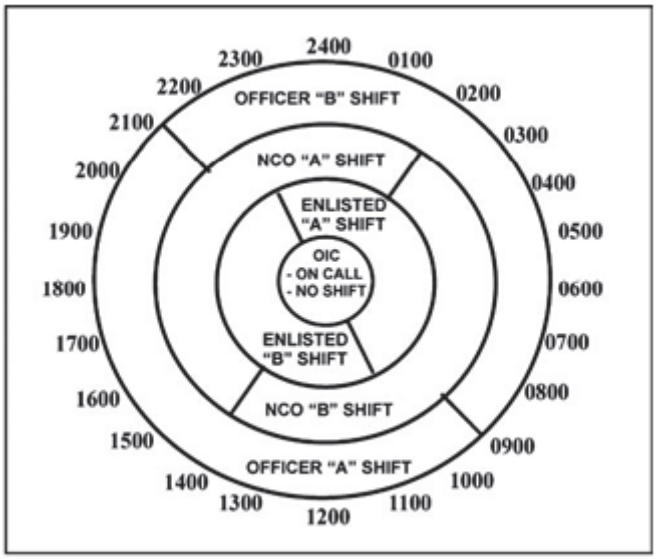

Figure 4-3. Staggered shift changes

4-27. Soldiers must conduct a one-on-one exchange of information with the person they are relieving. This must be followed by section-wide debriefs to ensure continuity in information flow and handoff of ongoing staff actions.

4-28. Following the individual brief, section level products and actions should be reviewed. Each staff section should accomplish the following actions:

- Review the digital journal for the past 12 hours.
- Review and update any CCIRs, PIRs, and information requirements (IRs).
- Review the current approved overlays.
- Review the current COP products.
- Check files to ensure standard naming conventions are used.
- Review the UTO.
- Check section web products for updating and to ensure they are posted properly.

4-29. A collective information exchange in the form of a shift change brief must be conducted so that the incoming shift receives a positive change of control. Personnel from different staff sections will have access to the key information produced by other sections and CPs. This means that these handover briefings will focus much less on the rote exchange of information. Rather, these briefing sessions can function to focus personnel on available information, evaluation of information, the status of the current operations, and tasks to support future operations.

4-30. Critical digital considerations should be briefed collectively within the CP. Table 4-1 provides a good example of what this brief may look like. There is presently no doctrinal guidance on this process. Units should, therefore, develop SOPs to address this requirement.

- Current higher and brigade changes to task organization.
- Disposition/status of units.
- Current and future missions.
- Current operations.

Table 4-3. CP Shift Change Brief Example

S-3 Battle Captain	• Current higher and brigade changes to task organization. • Disposition/status of units. • Current and future missions. • Current operations. • LNO updates. • Combat power status. • Projected operations over next 12 hours. • Current timelines.
S-2/Weather	• PIR/CCIR. • Current SU and location/status of all ISR assets (national to division/brigade). • RFI/RFA to higher (ARFOR or national). • Weather—next 12 hours and impact/effects on friendly and enemy systems. • HVT/HPT. • Battle damage assessment. • Significant activities during the past 12 hours.

Table 4-3. CP Shift Change Brief Example (cont'd)

FSC	• Organization for combat. • Unit locations and status. • Priority of fires. • HPT/attack guidance matrix. • Fire support control measures. • Significant activities.
ALO	• Preplanned request status. • Immediate request status. • In-flight reports.
ADA	• Organization for combat. • Current ADA warning status. • Aircraft engagements. • Location and status of ADA units.
Engineer	• Operations since last update. • Status of equipment and Class IV/V. • Future engineer operations. • Recommendations for the commander.
Chemical	• CBRN condition. • Current and recommended MOPP. • Enemy CBRN activity. • Chemical unit locations and status.
S-1/S-4/Surgeon	• Equipment status. • Class VIII status. • Priority of support. • Personnel status/health service status.

S-3 BATTLE CAPTAIN

- LNO updates.
- Combat power status.
- Projected operations over next 12 hours.
- Current timelines.
- PIR/CCIR.
- Current SU and location/status of all ISR assets (national to division/brigade).
- Request for information/Request for action RFI/RFA to higher (ARMY FORCES or national).
- Weather—next 12 hours and impact/effects on friendly and enemy systems.

S-2/

- HVT/HPT.
- Battle damage assessment.
- Significant activities during the past 12 hours.

BATTLE RHYTHM

4-31. Battle rhythm is the sequencing of standardized command and control activities within a headquarters and throughout the force to facilitate effective command and control. It is the cycle of recurring, but flexible, events within a CP that focuses staff members to meet information and action requirements. These recurring events include—

- Shift change briefing.
- Target working group meeting.
- Reports.
- Operational update without the commander.
- Operational update briefings.
- Commanders' collaborative sessions.
- Operational synchronization meeting.

4-32. Battle rhythm establishes the time, frequency, and type of meetings, working groups, boards, and other events, and who attends them. Reports, briefings, meetings, and working groups all require input and preparation. Additionally, the outputs of certain working groups are inputs for other working groups. The battle rhythm accounts for such requirements. Staff officer and subordinate units require schedule to prepare for each MC event.

Battle rhythm demands careful planning and design. There are many competing demands which must be deconflicted. Even subordinate units impact a higher echelon's battle rhythm based on their needs and unit procedures. Two key things to consider when establishing SOPs for battle rhythm are scheduled updates (both with higher and subordinate units) and bandwidth. ABCS competes for bandwidth with the commander's digital updates or video teleconferences (VTCs), especially if the data passes over communications links between CPs. The MDMP can have one of the most dramatic effects on battle rhythm. The process is lengthy and detailed and must be closely coordinated with other ongoing actions. Figure 4-4 provides an example of battle rhythm.

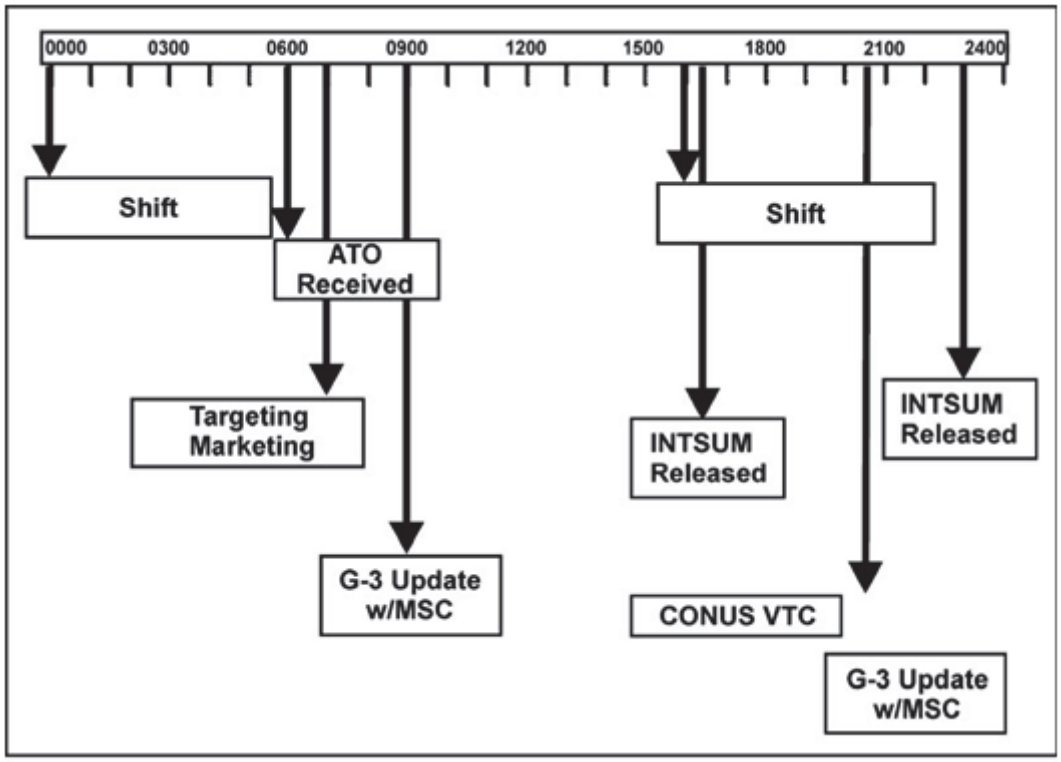

Figure 4-4. Battle rhythm

OPERATIONAL UPDATE AND ASSESSMENT BRIEFING

4-33. The purpose of this update is to provide the commander with analyzed information essential to decision making and to synchronize the staff's actions. Use of the COP expedites the operational update and makes it more current. The more information used from the COP, the more time the staff has to analyze and evaluate the information. The battle update briefing itself will center on the COP displayed in the CIC. The staff must be selective as to what other information is presented given the wealth of data and the fact that it is already available at each BAS. Unit SOPs, command guidance, and operational requirements will guide what information is briefed. Facts and capabilities may be presented in digital running estimates for the commander to review prior to the briefing. This allows the operational update briefing to focus on by-exception information and on specific commander issues.

4-34. Methods to update the commander depend on his location, connectivity, and the information he requires. Table 4-4 compares delivery methods.

Tables 4-4. Update Delivery Comparisons

Commander in CP	*Commander not in CP*
Verbal.	Voice (radio, phone).
Over the shoulder of an operator.	FBCB^2.
Commander's update page and pull-up information.	MCS or access to another BAS at his location.
Links to staff section pages and pull-up information.	Collaborative session.
Collaborative session.	
Large screen display.	

4-35. Traditionally, these updates were a recounting of significant events since the last update. To build the update, the CP would establish an information cut-off ("as of") time. The focus was on maintaining SU. ABCS has altered this briefing from a staff brief to a constantly available information package focusing on the commander's needs. Table 4-5 shows how the briefing has evolved from its traditional analog form to its digital form.

Table 4-5. Traditional Versus Digital Operation Update Briefings

Traditional	*Digital*
Significant events since last update.	Commander accesses his own critical information needs.
Current as of cut-off time.	Updated continuously.
Periodic event.	Available anytime.
Current SU.	Enhances SU.
Staff presentations and their preparation were significant event.	Staff routinely maintains information files which continues with normal operations.

4-36. Operational update briefs should maximize the use of information from BASs to aid in understanding the COP. Cutting and pasting information to non-ABCS briefing slides focuses on fact finding and less on analysis. The traditional form also consumes considerable time: 1+ hour to build/transmit slides; 1 hour to present (at brigade level); and 1 additional hour to present (at the division level). By the time slides are briefed, their information is outdated and inconsistent with the much more current COP.

REDUCED FUNCTIONALITY

4-37. Reduced digital functionality will occur, for example, when one or more BASs are not working properly. In turn, this will degrade the contribution of the respective BASs to MC. The realities and rigors of combat and field operations require digital personnel to be prepared to use ABCS with reduced functionality. They must develop a continuity of OPLAN that details establishing redundant, alternate, and archive information sources. Each of these sources should be prioritized and defined in the CP's Tactical Standard Operating Procedure (TACSOP). Likewise, TACSOPs should include troubleshooting techniques

and digital CP reboot drills to minimize the down time experienced for reboot operations. In its most degraded mode, the digital CP will revert back to analog operations.

4-38. Loss of functionality will require the digital staff to respond with the utmost urgency to restore normal capability. This may require a staff section or entire CP to simultaneously employ a double shift: one shift to restore functionality, the other to perform analog MC for the current, ongoing operation. Lost data will have to be recovered (see below) while analog data will have to be entered into ABCS once functionality is recovered. Loss of functionality will vary by degree, and each situation will require varied corrective actions by the staff as outlined below.

Routine Procedures

4-39. Each system will save information in ABCS COP overlay format for critical BAS items. ABCS COP SU overlays may periodically need to be saved as operations overlays to facilitate manual updates for digital graphics and unit icons. SU graphics and icons may not be available if the JCDB is inaccessible. Each system will use the ABCS common Snapshot Tool software to screen capture critical BAS information per an established battle rhythm to archive information. Each system should collaborate and share COP information vertically to aid retrieving critical information from same, higher, and subordinate systems.

Single BAS on LAN Crashes

4-40. Note the date-time group (DTG) of last saved digital overlay in the ABCS COP application (JCDB) depicting the system information and assess need to take nonoptimal actions. Employ other redundant systems within the CP or Future Operations cell to maintain data if reboot is extended. Request feeds from same/higher/subordinate systems if possible to update information. Manually manipulate operations overlay digital data through other ABCS systems with web page, CMP, or verbal input. Recall archived system BAS snapshot and continue tracking via non-ABCS application. Manually update system archive printout. Reproduce information on acetate overlay and post to analog map.

LAN Server Crashes

4-41. The MCS system is best oriented and constructed to act as the server. When the MCS crashes, the first ASAS or other MCS system to request information (ping) from the down server will attempt to become the server (an ASAS or another MCS may perform as server at the expense of degraded operations to its intended BAS use). Depending on the mission, the system should be brought down and rebooted to reestablish the server and subsequent Internet protocol (IP) address allocations. CPs need a battle drill for startup and reestablishment of the CP network that controls system boot up in a logical sequence that is repeated the same way each time the LAN is reestablished. This procedure significantly shortens the time necessary to reestablish the LAN. The server assigns IP addresses each time in the same order. The order should be prioritized by COP reestablishment, typically as MCS, ASAS, AFATDS, AMDWS, and digital tactical trunking switch (DTSS). Because it takes about an hour to reboot the system and reestablish operations, the CP should report its status to higher, adjacent, and subordinate units to ensure reports are sent via alternate means until the network is operational.

- Note the DTG of last saved digital overlays by the BAS in the ABCS COP application (JCDB) depicting the system information and assess the need to take nonoptimal actions during server or LAN troubleshooting.
- Continue manual tracking of digital information within the ABCS COP and stovepipe applications with TACLAN overlay feeds if possible from higher and subordinate systems.
- Review the status of the CP secondary server or LAN and other LAN capabilities within the Future Operations cell, TOC or Administrative and Logistical Operations Center (ALOC) to maintain data until a reboot is possible.
- Request information tracking from higher/subordinate systems, if possible, to maintain critical information.
- Manipulate operations overlay data with web page or verbal input.

- Recall archived system BAS snapshots and continues tracking via non-ABCS applications such as MS Paint or MS PowerPoint.
- Manually update system archive printouts.
- Reproduce critical BAS information on acetate overlays and post to analog maps.

Other Uses for Archival Information

4-42. Hardcopy Joint Photographic Experts Group (JPEG) snapshots (screen captures) of the COP and BAS COP screens have the following uses:

- Provide off-screen clarification or support "what if" analysis.
- May be sent to/received from other echelons to confirm the COP among CPs.
- Can be used in a white board collaboration (secondary to an actual ABCS COP application overlay) to discuss branch and sequel operations between BAS systems.
- Hardcopy printouts may be used as an interim update during COP build times.
- Snapshots also support after action reviews (AARs) and the historical tracking of battle information.
- Snapshots may be used in briefings or in OPORDs to illustrate narratives and to increase understanding of relational ABCS information formats.
- May be used to pass information to nondigital units via the TACLAN or LNOs to keep them apprised of the COP.

ANALOG UNIT INTERACTION

4-43. Digitized units must be prepared to operate with nondigital units that do not have the technology to access the digital COP. Liaison parties will almost always be necessary to ensure full exchange of information between digitized and nondigitized units. The primary tasks of digital LNO teams are—

- Receipt and transmission of orders, graphics, and intelligence data via BAS.
- Provision of friendly and enemy SU to the analog unit using its BAS.
- Manual creation of the analog unit, friendly and enemy SU, and its transmission back to the parent organization.
- Fire support and coordination.

Planning

4-44. It is essential for a digitized unit to exchange liaison teams with nondigitized units early and consistently throughout the planning process. Nondigitized units must strive to conduct parallel planning but will be at a disadvantage without digital staff tools. Parallel planning requires rapid exchange of information with analog units during the planning process. Involving higher, adjacent, and lower staff elements early in the planning process allows the entire staff to "see" both current and future operations and to identify known or potential problem areas.

Liasion Teams

4-45. Digital liaison teams may be sent to the analog unit's CP. This will provide at least some digital capability to analog units. These teams will support SU for both the digital and nondigital unit, the issue of orders, and informal information exchange. The number of liaison teams is limited, and these alone cannot solve the MC challenges of analog units which are without digitally-based SU. Liaison teams may be needed to escort elements of the analog unit, even down to single vehicles if necessary. This latter option will provide SU for these analog elements but is only practical if the digital unit forms additional liaison elements.

Equipment Requirements

4-46. The equipment and skills required of the liaison teams are a function of the type of operation being conducted and the force with which the team is coordinating. There are three basic forms of liaison which affect the task organization of liaison teams:

- Digital unit to digital unit: This requires the least equipment and personnel because information is easily shared in near-real-time. Critical SU is maintained in each unit's knowledge base.
- Digital unit to analog unit: This may occur when conducting operations with some Regular Army units, most Reserve Component units, and multinational forces. These teams require a full suite of digital systems to maintain the parent unit's COP and to provide SU of the nondigitized force back to the digital headquarters. Representation from each staff section may be required on the team.
- Digital unit to nonmilitary forces/agencies: Same as for analog units, but augmented with additional specialties such as the G-9/S-9(assistant chief of staff, civil affairs).

COMMON OPERATIONAL PICTURE

DEFINITIONS

- Common operational picture (COP): An operational picture tailored to the user's requirements, based on common data and information shared by more than one command. The COP facilitates collaborative planning and assists all echelons to achieve situational understanding.
- Operational picture (OP): A single display of relevant information (RI) within a commander's area of interest. By collaborating and sharing RI, and tailoring it to their needs, separate echelons create a COP.
- Relevant Information: All information of importance to the commander and staff in the exercise of MC.
- Situational understanding (SU): Knowledge and understanding of the relationship between forces which identify opportunities, threats, and gaps in information. It is the product of applying analysis and judgment to the common operational picture to determine relationships among the factors of METT-TC.

COMPOSITION OF THE COP

4-47. Each BAS provides its own unique view or "picture" of the operational environment which, taken together, comprise the COP (see Figure 4-6). The commander can tailor the components of the COP to fit the tactical situation, key features of the area of operation, and his own requirements for MC.

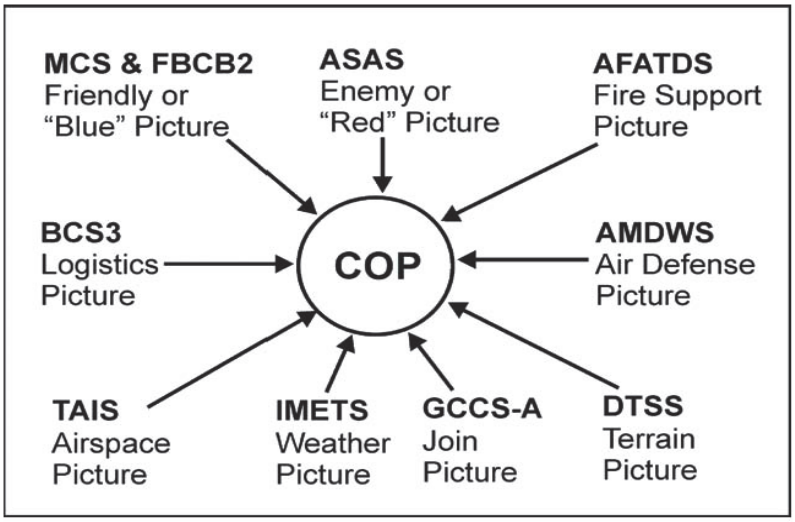

Figure 4-5. BAS picture contribution to COP

4-48. The COP is dynamically updated; as data changes throughout the network, the COP reflects those changes. This enables personnel to "see" the operational environment more accurately and in near-real-time. Personnel can quickly access and display on one screen the critical, time-sensitive information, intelligence, and data drawn from the other BASs within the CP or from higher and lower echelons. Further details on the input from each BAS are provided below.

- GCCS-A: Political boundaries with countries differentiated by color; friendly and enemy ground units, naval vessels, obstacles, and military installations.
- MCS: Friendly unit locations; graphic control measures; orders; task organization.
- ASAS: Enemy unit locations, parentage, and status; enemy equipment, facilities, and individuals.
- AFATDS: Fire unit and radar range fans; fire support coordination measures (FSCMs); preplanned fires; final protective fires; active fire support missions.
- AMDWS: Air defense weapon and sensor coverage; location, speed and flight direction of aircraft; tactical ballistic missile launch and impact point, current track, and launch/impact point pairing line.
- BCS3: Supply status by class of supply for units, facilities, and transportation features; supply and maintenance points and supply routes.
- FBCB2: Individual vehicle icons of platforms equipped with FBCB2.
- TAIS: Multidimensional display of ACOs and ACMs.
- IMETS: Standard weather symbology depicting current weather conditions, forecasts, and severe weather warnings; weather contour overlays to show 30+ different weather conditions (for example, cloud cover, wind, precipitation, temperature).
- DTSS: mobility, traffic ability; line-of-sight tactical decision aids and background images.

4-49. The remainder of this chapter provides further details on the components and construction of the COP. In addition, paragraph 4-6 provides further detail on the operational enhancements gained through the COP.

COP COMPONENTS AND SUPPORTING FUNCTIONS

4-50. ABCS supports the components comprising the COP as shown at Table 4-6.

Table 4-6. ABCS Support to COP Components and Functions

COP Components	
COP Application	This is the software that combines various visual products to build and maintain the COP. These products consist of friendly and enemy forces data, operational graphics, and terrain and weather data. The COP interfaces with the JCDB and JMTK.
System Window	This acts as the digital map board (situation map). The System Window automatically loads on the screen through the JMTK. The System Window includes the Overlay Explorer Window.
Overlay Explorer Window	This is the Graphic User Interface (GUI) that manages the chart tabs, overlays, map objects (known as "children"), and various symbology tools (MilSym Manager). It is the graphical interface the user employs to select units and overlays from the JCDB, to filter them using modifiable criteria, and to display them on map backgrounds provided by the JMTK. This manages the overlays, objects, and information applied to the System Window (the digital map board).
Chart Tabs	These serve as the digital mapboards that contain static (notional) and CP (dynamic) overlays which are created by the various staff sections and units for planning and execution. The chart tabs are functionally like analog mapboards that use grease pencils and acetate and are posted around the various staff sections in a CP. The chart tabs are displayed in the System Window and are listed in the Overlay Explorer Window.
Map Areas	These allow the commander and staff to establish pre-set map views in an active chart tab. The map area is set to a certain scale, zoom, and map center. When a map area is recalled, it displays that pre-set map view which facilitates tracking the battle and disposition of forces without having to toggle to different chart tabs in the System Window.
Static (Notional) Overlays	These are overlays that are particularly useful for planning and execution. They contain battlefield geometry, graphics, and planned or templated unit locations. The static (notional) overlays can be thought of as the analog acetate drops that can be overlaid together on a map. These overlays appear on active chart tabs along with that particular overlay's objects (symbols).
CP Picture	This is the "container" consisting of CP overlays and CP filters.
CP Overlay	This is a dynamic overlay that receives updated or current live feeds and geometry. It includes CP filters and is posted to an active chart tab. The CP overlay is the companion overlay to the static (notional) overlay.
CP Filters	These are associated with either a CP overlay or chart tab. The filters allow the operator to query the database for specific map objects. Those map objects are seen in a choice of filter types that include: unit information, enemy information, enemy unit information, enemy facility information, enemy equipment information, and battlefield geometry.
Supporting Functions	
JCDB	The COP application displays information from a shared database called the JCDB. It is the master database that contains information shared across BAS and supporting systems to include individual unit information. The JCDB is "invisible" to the user and need not be directly accessed by the user to build the COP.
JMTK	This is the graphical interface by which the user receives the desired map(s). It acts as the digital mapboard.

TAILORING THE COP

4-51. The COP application enables the commander to tailor the wealth of information into specified WFF COP views. Even though the information is functionally managed and updated by various systems

throughout the TI, the Data Distribution Architecture ensures the availability of critical, time-sensitive information to the commander and staff.

4-52. The COP can be established and/or modified through the map areas and chart tabs. This can be done by manipulating their respective variables as listed at Table 4-7 according to unit SOP and command guidance.

Table 4-7. Methods for Tailoring the COP

Establish/Modify	*Variables*	*By Manipulating*
Map Areas	Map Settings	Scale Zoom Map Center
Chart Tabs	Overlays	CP Overlays Notional Overlays
	CP Filters	Friendly (blue) Enemy (red) Geometry

4-53. Map Areas: Map areas display portions of the map and allow the operator to switch between specified areas quickly. Map areas are set by specifying scale, zoom, and map center. The user can quickly switch between the specified map areas with different center grid coordinates and zoom scales of the battlefield without switching the map setting.

4-54. Recommended map areas for inclusion in the COP are shown at Table 4-8. The center grid used on each map should also be specified.

Table 4-8. Recommended Map Areas for COP

Unit/Echelon	*Map Area*
Higher	Map area for the next echelon above one's own.
Own	Map area for one's own echelon.
Lower1 Lower2 Lower3, etc.	Map area(s) for subordinate units at the next lower echelon from one's own (one map area per unit).
Adjacent1 Adjacent2 Adjacent3 etc.	Map area(s) for adjacent elements.

4-55. While the requirements of a particular operation may demand some variation, ordinarily, the following map scales should be used for the echelons indicated in Table 4-9.

Table 4-9. Recommended Map Scales

Echelon	*Map Scale*
Division	1:200,000
Brigade	1:100,000
Task Force	1:50,000

4-56. Filters. The operator builds a CP filter based on what his supervisor specifically directs him to display in the CP overlay or chart tab. The tools the operator uses to build the CP filter include filter attributes, filter values, and "operators" (-, +, <, >, =).

4-57. ***Example CP Filter***: An operator is directed to create an overlay with CP filters that only show current company units loaded into the database. The operator would create a CP filter overlay from the Overlay Explorer Window File menu pull down and set the CP filter active to an active CP overlay listed in the Overlay Explorer Window. From the Edit Window, the operator selects the desired filter type, which in this example would be unit information. From the Available Attributes Window, the operator selects Echelon and selects the company size value, then adds it to the Query Criteria panel in the Edit Window. The operator runs the database query from the "run query" icon in the toolbar of the Edit Window, and the operator finally selects the File menu pull down of the Edit Window and selects "Update." The objects (company units) populate the Overlay Explorer Window and the objects appear on the map view.

CHART TABS

4-58. Chart tabs consist of set map areas, static (notional) overlays, and CP (dynamic) overlays with associated CP filters. Live feeds display on active chart tabs. It is recommended that the number of chart tabs be kept to four because of current software limitations. Table 4-10 provides an example set of chart tabs for the brigade echelon and their corresponding overlays.

Table 4-10. Example Chart Tabs for Brigade Echelon

Chart Tab	*Function*	*Overlays*	*Composition*
OPNS	Track and fight current battle.	BDE MVR ENG_OBSTACTUAL	Live feeds. Bde current operations.
RECON	Track and fight recon/counter-recon battle.	ISR SITTEMP ENG_OBSTACTUAL	Live feeds. Recon current operations. Counter-recon operations.
CLR_FIRES	Clear artillery fires.	BDE MVR FS_FSCM FS_TARGETS FS_RNGFAN MVR_ACM	Live feeds. Current fires. Current FSCM. Current ACM.
REAR	Track and fight activity in rear area.	BDE MVR SUSTAINMENT_RTS SUSTAINMENT_POINTS	Live feeds. Current MSRs. Current supply activities.

Note: The "System" chart tab should be renamed to one of the four recommended above.

OVERLAYS

4-59. COP overlays are static (notional) or dynamic (CP). COP overlays contain battlefield geometry, graphics, planned or templated unit locations, and live feeds. Staffs use static overlays for planning and execution. Dynamic overlays populate the JCDB from BAS legacy databases and are rendered to the COP by a CP filter, overlay, and picture definitions. Dynamic overlays are changing and current, whereas the static overlays present a snapshot of time or disposition. The combination of static and dynamic overlays is used to synchronize and track the battle by the commander, staff, and battle captain.

Static (Notional) Overlays

4-60. The list at Table 4-11 is a sample of notional overlays that may be produced by the various staff sections. The overlay identification (ID) column to the left is used in the overlay naming convention that is discussed further below. Example components for each overlay are also provided.

Table 4-11. Sample Notional Overlays

Overlay IDs	**Staff Section*	*Overlay Components*
INTEL_R/S	S-2	Named areas of interest, target areas of interest, observers.
INTEL_MCOO	S-2	Enemy air avenues of approach.
INTEL_SITTEMP	S-2	Templated enemy maneuver platforms within security zone, templated enemy maneuver platoons beyond security zone, templated enemy obstacles.
INTEL_OBST	S-2	Known enemy obstacles.
INTEL_WEATHER	S-2	IMETS weather overlay.
MVR_DIV	S-3	Division maneuver graphics.
MVR_BDE	S-3	Brigade maneuver graphics.
MVR_TF	S-3	Task force maneuver graphics; separate overlay for each battalion/task force.
MVR_CO	S-3	Company maneuver graphics; separate overlay for each company/team.
MVR_DST	S-3	Enemy most likely course of action, named areas of interest, possible target areas of interest, decision points, time phase lines, objective, boundaries, forward line of own troops.
MVR_ACM	S-3 Air/ADA	ACOs.
FS_TARGETS	FSC	Active priority targets.
FS_FSCM	FSC	Fire support coordination measures currently in effect.
ENG_OBSTPLAN	Engr	Planned obstacles.
ENG_OBSTEXEC	Engr	Executed obstacles.
ENG_SURVPLAN	Engr	Planned survivability construction.
ENG_SURVEXE	Engr	Executed survivability construction.
DTSS (doporsh1)	Engr	DTSS overlay provider.
SUSTAINMENT_ROUTES	S-4	All supply routes.

Table 4-11. Sample Notional Overlays (continued)

Overlay IDs	**Staff Section*	*Overlay Components*
SUSTAINMENT_POINTS	S-4	Ammunition supply points, ammunition transfer points, aid stations, Ambulance Exchange Points (AXP), unit maintenance collection points, logistics release points, refuel on the move locations, forward arming and refueling points, detainee collection points, refugee collection points, engineer supply points, supply points (Class I, III, V, VII, VIII, IX).
SUSTAINMENT_SPTAREAS	S-4	Task force support areas, brigade support area, division support area.
CBRN_DECON/AREAS	CHEMO	Decontamination sites, CBRN contaminated areas.
*Or comparable staff section at division/corps/EAC.		

Naming Convention for Static (Notional) Overlays

4-61. The COP includes a large number of notional overlays developed by different individuals and staff sections. Moreover, they must be updated frequently to keep the COP current and useful. This means that careful management of these many overlays and their many changes is absolutely critical. A naming convention is, therefore, required for labeling each overlay and update. Procedures for notifying COP users of these changes are also required. The naming convention should be stated in unit SOPs. An example system for labeling overlays is provided at Figure 4-7 and further explained at Table 4-12.

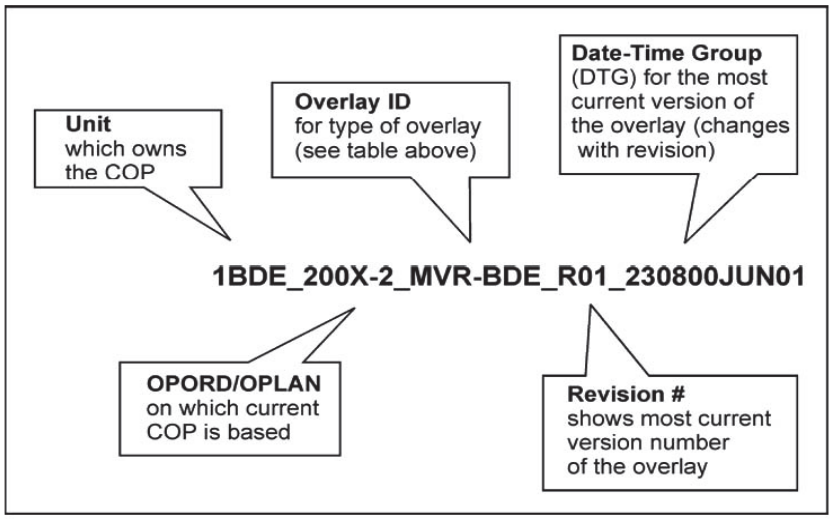

Figure 4-6. Naming convention example

Table 4-12. Naming Convention Explanation

Name Field	*Field Example*	*Field Explanation*
Unit	1BDE	This field shows the unit that owns the COP being developed. The unit name used must be the same for all overlays in the COP. This unit name should be established by unit SOP.
Order/Plan/Phase	200X-2	Show in this field the name of the order or plan on which the current COP is based. The order/plan will be named in accordance with unit SOP. See OPORD/FRAGO/OPLAN for naming. This field can also describe the phase of operation (i.e., MTA or PH2).
Overlay ID	MVR_BDE	Identify here the type of overlay being named. Examples for the ID are found in the above table under the Overlay IDs column.
Revision	R01	This field shows the most current version of the overlay. The initial version of the overlay is labeled "R01." Every time the overlay is revised, assign the next number (e.g., R02, R03).
DTG	230800JUN01	This field contains the date-time group (DTG) for the most current version of the overlay. When the Revision # (see above) is changed, the DTG of the overlay must be changed. Use the same time zone used in the operation (or the local time zone if an OPLAN).

Color Convention for Static (Notional) Overlays

4-62. As with overlay names, the composite picture formed by combined notional overlays from different sources will be confusing unless color is used in an orderly, consistent fashion. The unit must, therefore, institute standard usage of colors within the COP. Recommended and default colors for various graphics are provided below (Table 4-13). These colors are consistent with Military Standard 2525B and are supplemented where the default color is not sufficient for ready discrimination.

Table 4-13. Recommended and Default Colors

Recommended Colors	*Default Colors*
Division Graphics—Black	Hostile Graphics—Red
Brigade Graphics—Blue	Weapons Range Fan Graphics—Green
Task Force Graphics—Light Blue	Sensor Range Fan Graphics—Blue
Airspace Control Orders—Light Blue	Obstacle Graphics—Green
Signal Control Measures—Orange	
Chemical—Yellow	
FSCM—Same color as echelon graphics	

Dynamic (CP) Overlays

4-63. The current CP picture provides the dynamic unit locations to the COP in near-real-time. The types and echelons of units depicted are determined by the filters selected by the operator according to the commander's guidance. At Table 4-14 are examples of possible CP overlays. Each example lists the CP picture name, the staff section responsible for preparing the overlay, and the units/echelons depicted in the overlay.

Table 4-14. Example CP Overlays

CP Picture	**Staff Section*	***Picture Components*
MVR	S-3	Armor, infantry, and mortar platforms/units; task forces.
AVN	S-3	Rotary platforms/units.
FS	FSC	Artillery units, fixed wing aircraft, MLRS platoons, counterfire radar, counterfire radar fan.
ADA	ADO	ADA weapon platforms/units, ADA sensors, ADA sensor coverage.
ENG	Engr	Engineer units.
CHEM	N/A	(No element contained in COP template at present.)
MP	N/A	(No element contained in COP template at present.)
ENE_INTEL	S-2	Known enemy maneuver platforms/units within security zone; known enemy maneuver units beyond security zone, artillery units.
INTEL	S-2	Scout platforms/units.
SIG	S-6	Signal nodes.
SUSTAINMENT	S-4	Ambulances.
C^2	S-3	Division CPs, brigade CPs, battalion CPs, company CPs.
Note: The Declutter Tool must be used to filter out units by echelon from the selected chart tab.		
*Or comparable staff section at division/corps/EAC.		
**Echelons depicted depend on CP echelon and tactical requirements.		

Distributuion of Overlays

4-64. Through MCS, the S-3 staff section is responsible for the management of the COP. This is done as described below.

- To distribute static overlays within a CP, the MCS operator transmits an FTM, requesting that the staff forward their static overlays to the S-3's MCS workstation. Each staff section completes the static overlay and distributes it back to the MCS using the Plan Manager application. Dynamic overlays are distributed among ATCCS BAS (that is, MCS, ASAS, AFATDS, AMDWS, and BCS3) by Situational Awareness/Replication (S/R), Informix Enterprise Replicator (I-ER), and WDS (database replicator). Both static and dynamic overlays then enter each system JCDB.
- To distribute static overlays between CPs, the MCS operator sends the overlay through the Web Based Plan Manager. For CP overlays, the overlay is sent via I-ER. The distributed overlay enters the other CP's MCS JCDB which is then posted to the Available Map Objects panel in the Overlay Explorer window in COP.

DETAILED INPUT TO COP

4-65. Table 4-15 describes in detail the types of information that comprise and contribute to the COP. The chart lists the information elements and those BAS with the capability to exchange (send/receive) those elements. While only a guideline, the listed information is likely to be highly relevant to the commander and staff in forming the COP. These inputs to the COP are of two types:

- Overlays and data displayed within the COP.
- Reports that contribute to the display of information in the COP.

Table 4-15. Information comprising and contributing to COP

Information Name	*Applicable BAS*	*Description*
Position Report	GCCS-A, FBCB2, MCS, AFATDS, ASAS, BCS^3, AMDWS, TAIS	A report that provides friendly unit location data, preferably by automatic data exchange.
Operations Overlay	GCCS-A, FBCB2, MCS, AFATDS, ASAS, BCS^3, AMDWS, TAIS	A graphical depiction of the OPORD showing units, boundaries, control measures, and so forth, in a digital color map display or analog overlay.
Enemy Overlay	GCCS-A, FBCB2, MCS, AFATDS, ASAS, BCS^3, AMDWS, TAIS	A graphical depiction of the location, size, and activity (past, current, or planned) of enemy units.
Obstacle Overlay	GCCS-A, FBCB2, MCS, AFATDS, ASAS, BCS^3, AMDWS, TAIS	A graphical depiction of locations of friendly and enemy obstacles, including information on key terrain, status of friendly obstacles or barriers (completed, executed, planned, prepared), enemy obstacles, enemy ground avenues of approach, and effective times of the obstacles if known.
Combined Obstacle Overlay	GCCS-A, FBCB2, MCS, AFATDS, ASAS, BCS^3, AMDWS, TAIS	A graphical depiction of terrain under dry, normal, or wet conditions that depicts mobility and cross-country movement rates for use in avenue of approach analysis. The overlay integrates all obstacles into a single display, greatly simplifying further avenue of approach and mobility corridor analyses.
Modified Combined Obstacle Overlay	GCCS-A, MCS, AFATDS, ASAS, BCS^3, AMDWS, TAIS	A graphical depiction of the analysis results of the battlefield's effect on military operations. Based on a product depicting all obstacles to mobility, modified to also depict the following which is not prescriptive or inclusive: cross-country mobility classifications, objectives, and mobility corridors, likely locations of counter-mobility obstacle systems, defensible terrain, likely engagement areas and key terrain.
Fire Support Overlay	GCCS-A, MCS, AFATDS, ASAS, BCS^3, AMDWS, TAIS	A graphical depiction of FS coordinating measure text and graphics, locations of friendly artillery, mortar, and FS assets, areas that can be supported by FS weapons, areas that can be covered by FS sensors, radar, or observers, and ammunition supply points.
Air Space Coordination Overlay	GCCS-A, MCS, AFATDS, ASAS, BCS^3, AMDWS, TAIS	A graphical depiction of the lateral boundaries of the airspace control area, low-level transit routes, high-density airspace control zones, aircraft checkpoints, and standard Army aircraft flight zones.

Table 4-15. Information comprising and contributing to COP (continued)

Information Name	*Applicable BAS*	*Description*
Sustainment Overlay	GCCS-A, MCS, AFATDS, ASAS, BCS[3], AMDWS, TAIS	A map overlay that shows the current location of and mission information about sustainment operations. It can include information such as logistics release points, supply points, operational times, supply routes, and operational graphics necessary to identify unit boundaries or other important control measures to include support area unit and facility locations, Combat Trains Command Post (CTCP) locations, locations of forward supply points for classes III, V, and IX, locations of Unit Maintenance Collection Points (UMCPs), locations of Maintenance Support Teams (MSTs), locations of current and projected Medical Transfer Facility (MTF), AXPs, and Casualty Collection Points (CCPs), locations of field services such as laundry, bath, or graves registration, locations of major supply routes (MSRs) and Alternate Supply Routes (ASRs), and Standard Army Aviation Flight Routes (SAAFR).
Fire Plan Overlay	GCCS-A, MCS, AFATDS, ASAS, BCS[3], AMDWS, TAIS	A graphical depiction of information used to control and integrate direct and indirect fires at company level and below. It depicts the location of planned targets; target reference points; dead space; final protective fires; engagement areas; sectors of fire; and primary, alternate, and subsequent firing positions.
Range Card		A graphical depiction of a range card that is normally developed for each defensive fighting position and includes: the left and right firing limits, dead zones (areas that cannot be engaged by the weapons in the fighting position), ranges to likely points that the enemy may use, best grazing fire lines, the final protective fire line. The range cards typically feed the platoon fire plan overlay.
Sector ID Overlay	FBCB[2], MCS	A graphical depiction of defensive operations at company level and below to show division of responsibilities.
Traffic Control Overlay	GCCS-A, MCS, AFATDS, ASAS, BCS[3], AMDWS, TAIS	A graphical depiction of the routes, locations, and size of depicted units. Visually depicts the physical relationships of units (represented by the overlay) and terrain (represented by the map).
CBRN Overlay	GCCS-A, MCS, AFATDS, ASAS, BCS[3], AMDWS, TAIS	A graphical depiction of the location of decontamination sites, reconnaissance sites and smoke operation lines.
Sensor Data	FBCB[2], AFATDS, ASAS, AMDWS	Intelligence obtained from information collected by sensors regarding enemy movements/activities and to support estimates of enemy capabilities and intentions. Used primarily for Joint Surveillance Attack Radar System (JSTARS) Moving Target Indicators (MTI)/Fixed Target Indicators (FTI), and secondary imagery.

Table 4-15. Information comprising and contributing to COP (continued)

Information Name	*Applicable BAS*	*Description*
NBC Reports	FBCB[2], MCS, AFATDS, ASAS, BCS[3], AMDWS, TAIS	NBC 1 though NBC 6 reports. NBC attack data-initial (NBC 1). The NBC 1 report contains information provided by the observing unit that gives basic initial and follow-up data about a CBRN attack. NBC evaluated data (NBC 2). The NBC 2 report contains information based on two or more NBC 1 reports to provide evaluated CBRN data to units. NBC contamination-predicted (NBC 3). The NBC 3 report contains information provided to units detailing the predicted location and extent of CBRN contamination. NBC-reconnaissance, monitoring, and survey (NBC 4). When a unit detects CBRN hazards through monitoring, survey, or reconnaissance, this information is reported as an NBC 4 report. NBC-report of areas of contamination (NBC 5). Once NBC 4 reports are posted on the situation map, an NBC 5 report is prepared to show the contaminated area. NBC 5 reports are usually map overlays. NBC attack data-detailed (NBC 6). An NBC 6 report summarizes the results of a CBRN attack.
Threat Warning	GCCS-A, FBCB[2], MCS, AFATDS, ASAS, BCS[3], AMDWS, TAIS	A message notifying units, commanders, and personnel of an imminent ballistic missile, aircraft, or CBRN attack.
Spot Report	FBCB[2], MCS, AFATDS, ASAS, BCS[3], AMDWS, TAIS	The standard verbal or digital report giving information about known or suspected enemy activity, including observer designation and Size, Activity, Location, Unit, Time, and Equipment (SALUTE) data.
Obstacle Report	FBCB[2], MCS, AFATDS, ASAS, BCS[3], AMDWS, TAIS	A report giving obstacle type, location, impact on movement, bypass locations, safe corridors, and enemy activity near the obstacle. Platform through brigade levels.
Minefield Report	FBCB[2], MCS, AFATDS, ASAS, BCS[3], AMDWS, TAIS	Location and type of minefields employed by friendly forces. For minefields with automatic destruction capabilities, the time of destruction is also included.
Bridge Report	FBCB[2], MCS, AFATDS, ASAS, BCS[3], AMDPCS, TAIS	A report that includes bridge, overpass, culvert, underpass, and tunnel data; location; entrance; exit; type; overall length; width of roadway; height restrictions; number of spans; length of spans; computed classification; bypass locations; and bypass conditions in the area of operations. It also reports or confirms the description and condition of a bridge to support trafficability or destruction.
SITREP	FBCB[2], MCS, AFATDS, ASAS, BCS[3], AMDWS, TAIS	An informal report submitted by subordinate units on request or their own initiative to their higher HQ and adjacent units as necessary to report and define tactical situations and status.

Table 4-15. Information comprising and contributing to COP (continued)

Information Name	*Applicable BAS*	*Description*
Basic Weather Report	IMETS, MCS, AFATDS, ASAS, AMDWS	The basic weather (WX) report provides current weather observations and forecasts at predetermined intervals. It includes the forecast weather conditions and light data for the next 24 and 48 hours. Specific information that will be included are: end evening nautical twilight (EENT), beginning of morning nautical twilight (BMNT), sunrise time, sunset time, percent of illumination, moonrise, moonset, wind speed, wind direction, visibility, precipitation, temperature, ceiling, and barometric pressure, Chemical Downwind Message/Report (CDM/CDR), Effective Downwind Message/Downwind Report (EDM/EDR), and Basic Downwind Report (BDR)

THE COP AND THE OPERATIONS PROCESS

4-66. By providing a clear, accurate, and common view of the operational environment in near-real-time, the COP is key to each step of the operations process—plan, prepare, execute, and assess (see Figure 4-8)—as summarized below.

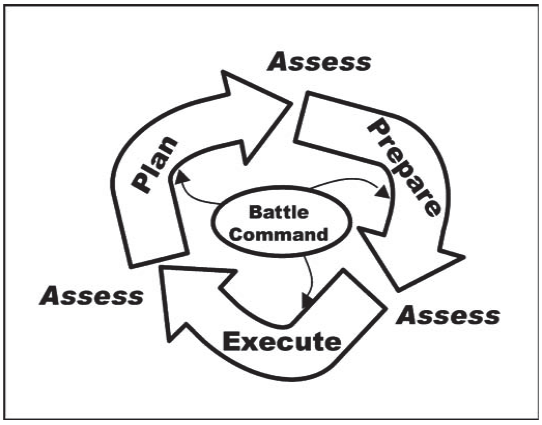

Figure 4-7. The operations process

Plan

- Intent and Planning Guidance: The commander can more readily impart his intent and issue planning guidance. The COP also helps to ensure a subordinate commander is himself planning within the intent and concept of operations of his own superior commander.
- Relevant Information: A commander can use the COP to depict his operational picture. This will help his staff and subordinate leaders focus on the relevant information for the operation. This will facilitate the planning process, resulting in more rapid planning and more precise understanding of and adherence to the commander's intent. SU of friendly forces is automatically fed into the COP. However, all other data must first be manually inputted into ABCS BASs before being automatically displayed, in turn, in the COP.
- Collaboration: Because leaders at different locations can simultaneously view the operational environment in an identical manner, collaboration is significantly enhanced, thereby facilitating planning, directing, and brief-backs. Staffs can use the same graphics and overlays (both active and notional) concurrently from different ABCS systems.

- Parallel Planning: The COP will help subordinate units conduct their own planning concurrent with the development of their parent headquarters' plans.
- Branches and Sequels: Different configurations of the COP can be developed to match anticipated branches and sequels of an operation. As the tactical situation evolves, revisions to the original plan can be rapidly disseminated such as changed operational graphics.
- Reduced Control Measures: The increased SU attained through the COP might possibly reduce the need for extensive control measures to coordinate maneuver and to avoid friendly-on friendly engagements. The will allow units to function more effectively should the battle become fluid and/or nonlinear. This must be balanced, however, with the fact that you will never have perfect SU.

PREPARE

- Brief-backs: Using the common framework provided by the COP, subordinate leader are better able to conform to the commander's intent and concept of operations. This common framework will also assist the subordinate in conveying his own plans during the brief-back.
- Plan Updates: Units can monitor the current tactical situation even as they ready themselves for an operation. Tactical plans and running estimates can be revised as necessary to meet changes in the operational environment as seen through the COP. This is especially critical in a highly fluid tactical situation.
- Rules of Engagement (ROE): The COP can be used to depict certain parts of the ROE. This will help to ensure the ROE are disseminated uniformly down to the lowest echelons.

EXECUTE

- Adaptability: Units can respond rapidly to the dictates of the evolving tactical situation during an operation. The shared SU increases the ability of commanders at all levels to quickly make the right decisions, synchronize their forces and fires, and increase the operational tempo.
- Initiative: Armed with the commander's intent and superior SU, subordinate leader's are better able to seize and retain the initiative within their respective tactical spheres. Units, therefore, will be better able to dictate the terms of combat in order to build momentum quickly and to win decisively.
- Risk Management: The commander will be better able to assess risk using the SU gained via the COP. This will enable him to act more aggressively while simultaneously enhancing the protection of his force.
- Friendly-on-Friendly Engagements: The enhanced SU gained through the COP combined with other command and control (C2), communications system, and ISR enhancements and improved optics will offer the opportunity to reduce the chance that friendly forces will become engaged with one another. This will contribute to protection, rapid engagement, and aggressive maneuver. This is, of course, contingent on the premise that all friendly forces involved have a full suite of fully operational ABCS.
- Changes to Operations: Using the COP, the commander can rapidly communicate changes to an ongoing operation. This might entail following a branch or sequel, changes to control measures, or even a new line of operations.

ASSESS

- Adaptability: Units can respond rapidly to the dictates of the evolving tactical situation during an operation. The shared SU increases the ability of commanders at all levels to quickly make the right decisions, synchronize their forces and fires, and increase the operational tempo.
- Initiative: Armed with the commander's intent and superior SU, subordinate leader's are better able to seize and retain the initiative within their respective tactical spheres. Units, therefore, will be better able to dictate the terms of combat in order to build momentum quickly and to win decisively.

- Risk Management: The commander will be better able to assess risk using the SU gained via the COP. This will enable him to act more aggressively while simultaneously enhancing the protection of his force.
- Friendly-on-Friendly Engagements: The enhanced SU gained through the COP combined with other command and control (C2), communications system, and ISR enhancements and improved optics will offer the opportunity to reduce the chance that friendly forces will become engaged with one another. This will contribute to protection, rapid engagement, and aggressive maneuver. This is, of course, contingent on the premise that all friendly forces involved have a full suite of fully operational ABCS.
- Changes to Operations: Using the COP, the commander can rapidly communicate changes to an ongoing operation. This might entail following a branch or sequel, changes to control measures, or even a new line of operations.

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Chapter 5

Airspace Command and Control (AC2)

Airspace command and control (AC2) consists of those actions that ensure the synchronization of airspace and enhancement of the MC of all forces using airspace. The goal of AC2 is to maximize the use of airspace, enabling the BCT Commander employ all of his combat power simultaneously in order to accomplish his mission while minimizing risk to all friendly forces. Effective airspace management and control enhances air defense measures, minimizes the risk of fratricide to airspace users1 and ground combat units, and increases overall force effectiveness.

5-1. Coordinating and integrating the use of the airspace is a force multiplier, ensuring that all war fighting functions are available to positively impact the course of the battle. Additionally, as airspace is critical for all joint forces, every action taken by one airspace user could potentially impact numerous other ongoing operations. For this reason, all units must ensure that all airspace users are identified, planned for and integrated into ongoing operations, maintained on the Common Operational Picture (COP) and positively directed and controlled (when necessary), in order to minimize conflicts and risks to all airspace users and operations.

5-2. Airspace is a joint medium for all friendly combatants. Each joint force component may operate aerial vehicles and weapons systems within the airspace with maximum freedom consistent with priorities, the degree of operationally acceptable risk, and the joint force commander's intent. The executive agent for airspace control is the Airspace Control Authority, which is usually the Joint Force Air Component Commander (JFACC).

5-3. Maneuver commanders at all levels exercise AC2 within their assigned areas through the integration of positive and procedural control. Typically many positive and procedural control measures will be directed by higher command authority. Both methods of MC are fully compatible and should be used in concert to effectively perform AC2

5-4. At the Brigade level, the ADAM/BAE must continuously plan for and monitor the operations of all airspace users in support of their operations and those transiting through the air over their ground AO. This continuous situational awareness (SA) is critical to ensure that the BCT can react to any situation requiring immediate use of airspace, such as immediate fires or CAS missions, unplanned UAS launch or diversion of aviation assets in real-time. The critical AMC functions that the ADAM/BAE must perform in support of the BCT are:

Note: Airspace users will include manned/unmanned aerial systems, munitions and directed energy weapons operated by all components, by coalition forces and authorized governmental and non governmental agencies.

- Tracking and identifying all airspace users in support of BCT operations and other airspace users transiting the area in order to facilitate situational awareness.
- Establishing plans that maximize employment of all systems while minimizing risk through analysis of airspace requirements and utilization.
- Communicating data, information and MC decisions to all airspace users, higher, lower and adjacent CPs and all applicable Army and Joint AMC nodes.
- Establishing and disseminating agreed upon procedures that govern the processes for planning and utilization of airspace and regulation of airspace users in support of BCT operations.

5-5. This chapter will address the organizations, authorities and procedures for accomplishing these functions in support of BCT operations.

AMC OPERATIONS AT DIVISION AND BRIGADE

5-6. Successful Brigade AMC operations depend on full integration with Division and other higher level and joint MC elements. The ADAM/BAE is not manned or equipped to provide all airspace control functions over the entire Brigade AO. For this reason, the ADAM/BAE is focused on planning for and controlling airspace users, while the Division controls the airspace. The distinction sounds slight, but the intention is that the Brigade is focused on its own operations and integrates and coordinates only those assets that are involved in the Brigade's operations. The Division is then responsible for controlling all airspace users not supporting the Brigade or for coordinating directly with the Brigade when outside users must enter the airspace over the Brigade AO. This benefits the Brigade as the Division must handle coordination with the multiple JIIM airspace users and develop and implement plans to ensure these JIIM users can accomplish their missions with no or minimal effect on Brigade operations. In most cases, the general concept is that the Division will control airspace while the AO- owning BCT will control airspace users. For the majority of operations, the responsibilities and relationship between the division and the BCT can be described as follows:

- Division Responsibilities. Division AMC remains responsible for AMC over the entire division AO regardless of whether the AO has been further assigned as BCT AOs. When a division allocates part of its AO to a BCT some AMC responsibilities can be delegated to the BCT. Division AMC is responsible for portions of the Division AO unassigned to BCTs. Division AMC is also responsible for integrating joint airspace and civil users over the entire division AO both in planning and in execution. If the Division has an unusually large AO or if the Division AO is non contiguous the division can delegate more AMC responsibilities to the BCTs but this may require augmentation of additional AMC personnel to the BCT.
- BCT Responsibilities. The authority of a BCT controlling an AO over Army airspace users is the same as BCT authority over ground units transiting its AO. BCTs controlling an AO have authority over all Army airspace users in their AO as well as joint aircraft in support of the BCT operations (such as CAS). All Army airspace users transiting a BCT AO are expected to coordinate with the BCT responsible for the AO they are transiting. Division will only integrate Army airspace use between BCTs if adjudication between BCTs is necessary. BCTs will normally have the authority to coordinate directly with joint airspace control elements controlling airspace over the BCT [(Control and Reporting Center (CRC)/Air Warning and Control System (AWACS)] for the purpose of fires coordination or immediate airspace coordination. In some situations, for example very heavily used airspace or airspace with many joint and civil airspace users, Division may withhold this authority.

5-7. Each BCT and Brigade has similar elements designed to provide AMC functionality.

- Modular BCTs, Brigades, and SBCTs. All of the modular BCT/Brigades (except sustainment) have a version of an organic ADAM/BAE or an ADAM. An ADAM/BAE has additional

aviation personnel and a larger aviation planning capability. This staff element is composed of ADA and aviation personnel and does the AMC integration function for the brigade in addition to its AMD and aviation functions. While other members of the brigade staff are key AMC members (FSE, ALO/TACP, TUAS operators), the ADAM/BAE OIC is the AMC integrator for the S-3. (The brigade AMC tasks in FM 3-52, Appendix B, remain valid for the modular brigade with the ADAM/BAE OIC responsible for the S-3 air tasks). Modular brigades do not normally control the airspace over their AO; the division can operate a volume of airspace over the BCTs. For certain situations, it may be necessary to request approval for a BCT to control a volume of airspace. If a BCT is to control a volume of airspace for an extended period, the ADAM/BAE should be augmented with additional ATS assets from the CAB ATS Company.

- Functional Brigades. Functional brigades without an organic AMC element (MP, engineers) assigned to the division retain the brigade responsibilities for AMC. If a functional brigade is under the control of a modular brigade (for example, MP brigade under a CSB (ME)), the modular brigade will integrate the functional brigade AMC requirements. If the functional brigade is directly under the control of the division then the division AMC element will integrate the brigade AMC requirements.
- Battlefield Surveillance/Combat Aviation/Fires Brigades. Several modular brigades do not routinely control AOs but perform division operations throughout the division AO. In previous division designs, AMC was managed centrally at division. While this is still the case for the overall division airspace plan, the relationship changes when supporting brigades are tasked to execute a division mission. When the combat aviation brigade is tasked to execute an attack (or a fires brigade is tasked to execute a strike operation), the center for planning is the supported brigade and the brigade ADAM is the lead AMC planner for that operation. The Main AMC element will support the brigade, and because of the greater experience level and manning of the Main AMC element, the Main AMC element may perform much of the airspace integration for the brigade. However, the final decision on how the airspace is integrated should be made based on the brigade commander's priorities. This is a difference from previous divisions where airspace planning occurred in a division deep operations coordination cell that provided the plan to the brigades executing the mission.

AMC ORGANIZATIONS AND KEY PERSONNEL

5-8. The Theater Air Ground System (TAGS) is a system of systems that orchestrates the planning and execution of air-ground operations. The TAGS is not a formal system, but is the sum of all component air-ground systems/nodes operating in a particular system. The TAGS for any theater will necessarily be tailored to the particular situation and mission.

- Joint Force Air Component Commander (JFACC)-The JFC will normally designate a JFACC. The JFACC's responsibilities will be assigned by the JFC (normally these would include, but not be limited to, planning, coordination, allocation, and tasking based on the JFC's apportionment decision). Using the JFC's guidance and authority, and in coordination with other Service component commanders and other assigned or supporting commanders, the JFACC will recommend to the JFC apportionment of air sorties to various missions or geographic areas.
- Airspace Coordination Authority (ACA). The ACA is the commander designated to assume overall responsibility for the operation of the airspace control system. The ACA establishes and coordinates an airspace control system that responds to the needs of the JFC, provides for integration into the airspace control system of the host nation, and coordinates and deconflicts user requirements. The ACA develops and coordinates the ACP and after JFC approval, disseminates it throughout the JOA/AOR. Implementation of the ACP is through the airspace control order (ACO). (See Joint Publication 3-52, *Doctrine for Joint Airspace Control in the Combat Zone* for details.)
- Area Air Defense Commander (AADC). Within a unified command, subordinate unified command, or joint task force, the commander will assign overall responsibility for air defense to

a single commander. Normally, this will be the component commander with the preponderance of air defense capability and the command, control, and communications capability to plan and execute integrated air defense operations. Representation from the other components involved will be provided, as appropriate, to the AADC's headquarters. The successful conduct of air defense operations requires the integrated operation of all available air defense systems. Air defense operations must be coordinated with other operations, both on and over land and sea. The AADC develops the area air defense plan and, after JFC approval, disseminates it throughout the AOR/JOA.

5-9. There are numerous joint organizations that function together as the Theater Air-Ground System (TAGS) components to ensure the safe, efficient utilization of airspace. The Air Force Theater Air Control System (TACS), the Army Air Ground System (AAGS), the Marine Air Command and Control System (MACCS) and the Navy Tactical Air Control System (NTACS) are the overarching component airspace systems. Generally a Division, Corps, or BCT-level Army AMC node will interact with the Air Force TACS or the Marine MACCS, but rarely with the Navy, and as such the NTACS will not be discussed in this document. As part of the AAGS, the AMC Elements and the ADAM and ADAM/BAEs provide added capability into the TAGS at the Army tactical levels. While the Brigade will not routinely coordinate directly with the joint and higher operational echelon elements listed here, it is essential to understand how these nodes play a critical role in AMC.

ARMY AIR-GROUND SYSTEM (AAGS)

5-10. Battlefield coordination detachment (BCD) – The BCD is the Army liaison provided by Army component or force commander to the JFACC and is co-located with the Joint Air Operations Center (JAOC). The BCD is organized into a headquarters element and six subsections: plans, operations, intelligence, air defense, airspace management, and airlift. These section works with their counterpart in the JAOC to eases planning, coordination, and execution of air-ground operations by ensuring that:

- JFACC understands the army forces Commander's intent, priorities and objectives
- Army requests for airspace coordination measures and air support are coordinated with the correct sections in the JAOC
- ATO and ACO accurately reflect air support and ACMs approved for Army.
- Coordinate air defense, theater missile defense (TMD), and airspace requirements.
- Coordinates changes to theater wide Air Defense Warnings, Weapons Control Statuses, ROE, and aircraft identification standards with JAOC, army forces and senior land-based air defense HQ.
- Represent the Army component during development of the ACO and ATO and ensures all approved air missions and ACMs are published in the ATO and ACO

5-11. Additionally, the BCD exercises supervision over the Army's air reconnaissance liaison officer teams and ground liaison officer augmentation teams that provide coordination between Army forces and USAF reconnaissance, fighter, and airlift wings.

- Ground Liaison Officer (GLO) – Found at each air wing operation center supporting ground operations. GLOs advise air commanders on Army organization, operations, tactics, and equipment. GLO's brief pilots on the ground situation provide guidance on target designation and identification of friendly troops and participate in the briefing of pilots on their return from missions. GLO's receive and report operational and intelligence data to the BCD.
- Army air and missile defense command (AAMDC) – Found at the theater level.

5-12. The AAMDC synchronizes Army contributions to counterair operations. Normally, the AAMDC is OPCON to the JFLCC and in direct support of the JFACC. The AAMDC commander performs three critical functions:

- Commands all Echelons above Corps AMD units ensuring protection of the priorities of the Army forces commander, the JFLCC, if appointed, and the joint force commander.

- Serves as the Theater Army AMD Coordinator (TAAMDCOORD), responsible to the army forces/JFLCC for ensuring that Army TAMD operations are properly coordinated and integrated with those of joint and multinational
- Serves as the Deputy Area Air Defense Commander (DAADC), assisting in planning, coordinating and integrating ground-based AMD forces into the theater defensive counter air (DCA) plan.

5-13. The AAMDC is normally collocated with the JAOC. If not collocated, the AAMDC sends a robust liaison team to the JFACC/AADC location. The AAMDC commander also maintains strong coordination linkages to AMD forces assigned, attached or in support of Corps and Divisions. When the AAMDC is deployed in theater, the AAMDC liaison team at the JFACC/AADC's location is the senior Army air defense element and the primary interface at the JAOC for all land-based active air defense force operations. The BCD ADA section coordinates its activities with the AAMDC liaison team and may augment the AAMDC liaison team.

5-14. Air Defense Artillery Fire Control Officer (ADAFCO) – Deployed from the ADA Brigade to CRC or a location where the Region or Sector Air Defense Commander (RADC/SADC) is located. This is typically at the CRC or, based on theater requirements, at the TAOC, AEGIS, or AWACS. The ADAFCO is the single Army point of contact between land based AMD fire direction centers and the AADC/RADC/SADC, responsible for deconflicting and controlling ADA engagements. Key functions of the ADAFCO are:

- Assist the CRC with deconfliction and identification of air tracks
- Provide early warning and cueing information to AMD units
- Send engagement orders to AMD units
- Assists airspace deconfliction between AMD fire and aircraft

5-15. Air Defense Artillery (ADA) brigade –Brigades are located at theater level. The ADA brigade deploys to a theater of operations to provide early warning (EW) and to defend JFC critical assets and activities from aerial attack, missile attack, and surveillance. The ADA brigade protects designated assets in the corps area of operations from enemy air attack. It provides the corps commander air defense of high priority assets and organizations and provides overwatch of all forward divisions as part of the theater defense design. ADA Brigades functions include:

Table 5-1 ADA Brigades Functions

THEATER ADA BDE	ADA BDE when protecting Corps
Control air environment	Provide freedom to maneuver
Protect the force	Protect key assets
Preserve nuclear options	Protect reserve
Protect DCA airpower	Reinforce divisions
Protect reinforcing assets	
Protect sustainment	
Protect MC	

5-16. Command post – Located at all Army echelons. A CP is a unit headquarters where the commander and staff perform their activities. Staffs coordinate, integrate and synchronize plans and operations, enabling the commander to control the operation. ADAM/BAE and AMC cells are integrated into CPs at and above the Brigade level and integrate the air operations into the staff processes, enabling the commander and CP to control airspace users and airspace utilization in sync with other ongoing operations. Key functions of the CP are:

- Maintaining running estimates and the common operational picture.
- Information management.

- Developing and disseminating orders.
- Controlling operations.
- Assessing operations.
- Coordinating with higher, lower, and adjacent units.

5-17. Fire Cell – Provides the commander at the Army Service component commander level with a cell dedicated to shaping the battlefield. The Fire Cell monitors execution of the battle through the joint AO, ATO, and land force participation in joint suppression of enemy air defenses (J–SEAD) operations, special operations missions, and unique targets of special interest to the commander. Key functions of the OFD are:

- Coordinates and synchronizes operational fires with the scheme of maneuver.
- Plans targeting objectives and priorities.
- Integrates target lists and FSCM.
- Coordinates special targets.
- Tracks target execution by other components and subordinate echelons.
- Synchronizes corps, echelon above corps, and joint deep operations.
- Coordinates and synchronizes employment of joint EW assets.
- Monitors execution of the deep battle, ATO, land force participation in J–SEAD
- Operations, special operations missions, and unique targets of special interest to the commander.

5-18. Army airspace command and control (AMC) – The Army's principal organization responsible for planning and executing airspace control (positive or procedural) of Army assets. Brigades through corps have dedicated AMC elements. The principal staff sections in an AMC element consist of representatives from AMD, Army aviation, and Army air traffic service. AMC element tasks include—

- Identify and forward Army airspace needs and requests to the ACA to be included in the ACP/ACO and to resolve conflicts.
- Maintain AMC overlays and develop AMC procedures, plans, standard operating procedures, and annexes to orders and plans.
- Integrate airspace user requirements and air operations within the AO in accordance with the commander’s scheme of maneuver and acceptable risk level.
- Prepare and submit ACMRs in support of air operations for inclusion in the ACO
- Coordinate Army airspace use with other components of a joint force and with adjacent units and provide single POC for JIIM airspace users within the unit AO
- Maintain air SA and coordinate with TAGS nodes, subordinate and adjacent units and airspace users to identify all airspace entities
- Advise subordinate and higher headquarters of the impact of airspace control measures or restrictions on the ground battle.
- Resolve airspace conflicts during operations by coordinating changes in timing, sequencing, routing or trajectories with affected airspace users.
- Recommend appropriate COA to commanders when airspace conflicts cannot be resolved with adjustments to timing, sequencing, routing or trajectories

5-19. Fires cell – The FSCOORD directs the overall fire support system and ensures that all available fire support means are fully synchronized with the battle plan. The FSCOORD also advises the commander on the best use of available fire support resources, develops and implements the fire support plan, and issues necessary orders in the name of the commander. In addition, the FSCOORD plans and coordinates engagement of surface targets, target acquisition, radar emplacement, counterfire operations, and deception operations by fire support means. The FSCOORD leads an organic fire support cell at each echelon of

command. The four basic tasks of fire support are to support the force in combat, support the force commander's battle plan, synchronize fire support, and sustain the fire support system.

5-20. Air defense and airspace management/brigade aviation element (ADAM/BAE) – Located at the brigade combat team (BCT) level. BCTs have an ADAM/BAE cell responsible for air space management. ADAM/BAE cells plan, coordinate, and establish connectivity with JIIM sensors and command and control networks, as well as airspace users; provide aerial situational awareness and early warning; and conduct continuous planning and execution of airspace management requirements for the supported unit/echelon and conduct Army air and missile defense and aviation planning. The Brigade Aviation Officer is the lead integrator for AMC within the Brigade. AMC tasks for the ADAM/BAE are addressed in the planning and execution sections of this chapter.

5-21. Army Air Traffic Services (ATS): The Army has ATS units at Theater level and organic to the Combat Aviation Brigade. Theater ATS consist of the Theater Airfield Operations Group (TAOG) with its subordinate Airfield Operations Battalions (AOB). The role of these units is to establish and operate airfields as needed in the army forces AO. The AOBs are capable of operating a fully instrumented airfield (with ASR/PAR) and the controlled airspace necessary to support airfield operations. Each CAB has an organic ATS company (part of the General Support Aviation Battalion). The ATS company contains:

- An airfield platoon capable of operating a fully instrumented airfield (with ASR/PAR) and the controlled airspace necessary to support airfield operations. An enroute Platoon with two Tactical Airspace Control Teams (TACT) each capable of controlling a PZ/LZ and an Airspace Information Center (AIC) capable of providing flight following support.
- Fire support team – A team of FA personnel organic to Army modular force units and positioned with company-size maneuver units. The fire support team plans and coordinates all supporting fires available to the unit, including mortar, FA, NSFS, and CAS integration.
- Joint fires observer (JFO) – A trained and certified service member who can request, adjust, and control surface-to-surface fires, provide targeting information in support of Type 2 and 3 CAS terminal attack controls, and perform autonomous terminal guidance operations (TGO). The JFO is not an additional Soldier in his Army fire support organization, but rather an individual who has received the necessary training and certification to receive the JFO's additional skill identifier.

AIR FORCE THEATER AIR CONTROL SYSTEM (TACS)

5-22. Air and Space Operations Center (AOC). The AOC is the air and space operations planning and execution focal point for the AFFOR, where centralized planning, direction, control, coordination, and assessment of air and space operations occur. Primary AOC functions include:

- Develop air operations strategy and planning documents that integrate air, space, and cyber operations to meet objectives and guidance.
- Task and execute day-to-day air operations; provide rapid reaction, positive control, and coordinated and deconflicted weapons employment; and integrate the total air effort.
- Receive, assemble, analyze, filter, and disseminate all-source intelligence and weather information to support air operations planning, execution, and assessment.
- Issue ACO and coordinate airspace control activities for the ACA
- Provide overall direction of air defense, including TMD, for the AADC
- Plan, task, and execute theater ISR missions.
- Conduct operational-level assessment to determine mission and overall air operations effectiveness to support the theater CA effort.
- Produce and disseminate an ATO and changes.
- Provide for the integration and support of all air mobility missions.
- Provide guidance for theater tactical data link (TDL) operations.

5-23. Control and Reporting Center (CRC). The CRC is directly subordinate to the JAOC and is the senior TACS radar element responsible for decentralized execution of air defense and airspace control. The CRC provides battle management, weapons control, surveillance, identification, and link management. The CRC provides positive and procedural airspace control. The CRC is assigned a geographic sector by the JAOC, within which it manages all defensive air, offensive air and airspace management activities. The CRC is responsible for recommending changes in air defense (AD) warning conditions based on the air situation. As a control node in the TACS, the CRC does not have command authority over Army forces in their sector, and as such cannot deny combat operations to the ground commander. Communications linkages with the CRC can facilitate the commander's attempts to clear airspace and minimize fratricide, but do not imply any command relationship.

5-24. Air Support Operations Center (ASOC). The ASOC is directly subordinate to the JAOC, but normally located with an Army corps. The ASOC is responsible for integration of aerospace operations that support the Army commander. The ASOC responds to requests for air support and integrates CAS, AI, intratheater airlift, ISR, SEAD, and CSAR in the corps AO. The ASOC plays a major role in airspace control in the corps AO through execution of joint airspace control measures, such as high density airspace control zones (HIDACZs) and minimum risk routes. It deconflicts airspace usage with the corps fire support element, G-3 Air, and AMC element. The ASOC director, normally the corps ALO, exercises OPCON of all subordinate TACPs.

5-25. Tactical Air Control Parties (TACP). TACP are the principal Air Force liaison element aligned with Army maneuver units from battalion through corps, and consists of air liaison officers, terminal attack controllers, radio maintenance personnel, supply personnel, fleet management personnel, and information management personnel. TACPs are the extensions of the TACS and remain under the OPCON of the COMAFFOR through the ASOC. They coordinate directly with Army airspace and fire support agencies to deconflict air operations in the ground sector and may employ both formal and informal fire support coordinating measures to prevent fratricide or synchronize air operations with surface fire support. TACPs provide procedural airspace control.

5-26. Airborne Warning and Control System (AWACS). AWACS is an airborne early warning and MC battle management aircraft that provides a high degree of flexibility and survivability in the combat zone. During the initial phase of operations, AWACS can provide airspace control and battle management functions for the JAOC. AWACS is normally subordinate to the CRC, greatly extends the TACS surveillance radar coverage, and provides early combat identification of nonfriendly tracks. AWACS provides positive and procedural airspace control.

5-27. Joint Surveillance Target Attack Radar System (JSTARS). JSTARS is an Air Force-Army battle management MC system subordinate to the JAOC. The system provides Army and Air Force command, control, communications, computers, and intelligence (C4I) nodes with information to support the attack of ground targets. It does this by supplying moving target indicator data and synthetic aperture radar data and by exchanging other mission-related information between JSTARS aircraft, other TACS elements, and Army common ground stations. The system is designed to provide near real-time, wide-area surveillance and targeting information on moving and stationary ground targets to support the land component commander's requirements. However, the JFC determines the most effective use of JSTARS based on the situation and concept of operations. JSTARS is also used to identify opportunities for rapid interdiction and to retarget enemy ground forces in support of the JFACC's theater-wide interdiction responsibility. JSTARS is also capable of supporting air operations, to include CAS, offensive counterair, and other missions spanning the range of military operations, thus enabling the JAOC to establish ACMs in response to the ground threat.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS)

5-28. The Tactical Air Command Center (TACC) is the senior air command and control agency providing centralized command. It is the command post for the ACE commander. It consists of three sections: current operations, future operations, and future plans. Current operations monitor execution of the ATO and make

adjustments as dictated by the tactical situation. Future operations develop and disseminate the MAGTF air tasking order. Future plans develop the plan to support the next MAGTF mission.

5-29. The Marine Air Traffic Control (MATC) detachment provides continuous, all-weather air traffic control services to air bases and air facilities. It also provides expeditionary airfields and remote area landing sites as a part of the MACCS.

5-30. The Tactical Air Operations Center (TAOC) is the radar agency that conducts antiair warfare (AAW), en route air traffic control, navigational assistance, surveillance, data link, and identification functions. It controls AAW aircraft and surface-to-air weapons in its assigned sector. The TAOC conducts theater ballistic missile defense and tactical digital information link (TADIL)-A, -B, and –J operations.

5-31. A Low-Altitude Air Defense (LAAD) unit provides close in, low altitude surface-to-air weapons fires utilizing the Stinger and Avenger missile systems. It defends either one or a combination of forward combat areas, maneuver forces, vital areas, installations, and units engaged in special or independent operations.

5-32. An Early Warning/Control (EW/C) site is subordinate to and echeloned from a TAOC. This site is task organized to perform AAW, en route air traffic control, navigational assistance, surveillance, data link, and identification missions. While maintaining a smaller footprint than a TAOC, the EW/C site has the same functions but on a smaller scale.

5-33. The Direct Air Support Center (DASC) provides procedural control services. It is the air control agency responsible for decentralized execution of immediate close air support and assault support missions. It processes and coordinates requests for immediate air support. It is normally co-located with the senior FSCC or force fires coordination center. The DASC consists of—

- The Direct Air Support Center (Airborne) (DASC [A]). It is subordinate to and performs the same functions as the DASC. It augments the DASC during periods of degraded capabilities, adverse communication conditions, and amphibious operations while control is being phased ashore. The DASC (A) operates from a specially configured KC-130, Hercules.
- The Air Support Element. (ASE) is subordinate to, performs the same functions as, and has the same capability as the DASC. It is task organized to perform various air support control functions. Employment options can range from Marine expeditionary unit level operations characterized by limited assets and endurance to a multidivisional operation. The air support element is almost identical in capabilities—but set apart in responsibilities—and subordinate to the DASC. The air support element can function as an extension of the Navy tactical air control center or helicopter direction center with the battalion tactical air control party.
- The Tactical Air Coordinator (Airborne) (TAC [A]). He performs as an airborne extension of the DASC or FSCC and deconflicts aircraft through airspace coordination. He coordinates aircraft with other supporting arms, such as artillery or naval gunfire.
- The Assault Support Coordinator (Airborne) (ASC [A]). He provides air coordination and control during helicopter operations. He also serves as an extension of the DASC or helicopter direction center to support the air mission commander. He coordinates airspace and assault support operations; movement of air assault aircraft through airspace; and close air support providing for helicopter assault operations.

5-34. The Tactical Air Control Party (TACP) is an integral part of each combat unit from division down to the battalion level. It acts as an air advisor to the maneuver unit, assists in the submission of preplanned and immediate air support requests, and provides terminal control for supporting aircraft.

5-35. The Forward Air Controller (Airborne) (FAC [A]) is the airborne extension of the ground forward air controller (FAC). He performs air reconnaissance and surveillance; has terminal control of close air support, artillery, and naval gunfire radio relay for ground FACs; and maintains landing zone preparations.

AMC DOCUMENTS

5-36. As with all organizations, there are many key documents that govern or affect airspace usage.

JOINT AIR OPERATIONS PLAN (JAOP)

5-37. The JAOP includes tasked forces, message formats, suspense's for planning and execution phases, and ROE. The JAOP translates JFACC tasking from the JFC into an air strategy and establishes the JFACC's objectives. (See JP 3-01). The JAOP accomplishes the following:

- Integrates the efforts of joint air and space capabilities and forces.
- Identifies desired effects to achieve, expressed in terms of air objectives and tasks.
- Identifies measures or indicators of success, used to determine whether air operations are meeting assigned objectives.
- Accounts for current and potential adversary offensive and defensive COAs.
- Incorporates space capabilities into the JAOP.
- Synchronizes the phasing of air and space operations with the JFC's plan:
  - The first phase normally will involve counterair operations to attain and maintain the required degree of air superiority to accomplish other joint actions.
  - The first phase will also involve counterspace and information operations to attain and maintain space and information superiority.
- Offensive air operations may begin in conjunction with the initial counterair operations or be delayed until the requisite air superiority is achieved to reduce losses and attain greater freedom of action.
- Indicates what capabilities and forces are required to achieve joint air objectives.
- Once Service components provide their information, total force structure is determined; force availability, deployment timing, bed down availability, and sustainment requirements are matched with logistic and planning requirements.

AIRSPACE CONTROL PLAN (ACP)

5-38. Developed by the Airspace Control Authority to provide general overall guidance on airspace control. Key elements of the ACP include:

- Description of AOR / JOA to which airspace applies
- Appointment of ACA and location of ACA headquarters
- List of current existing capabilities within the AOR/JOA to provide airspace control.
- Description and duties of the ACA - each airspace user, including liaisons, and coordination with ACA and elements used in airspace control system.
- Description of the interface between the TAGS and ATC.
- Description of the interface between ACA, the AADC, and Fire Support Coordination Elements, and the procedures to deconflict air defense and operational requirements.
- Description of interface with the FAA, host-nation Air Traffic Control System and / or ICAO.
- Description of the interface between US and multinational forces to coordinate and deconflict airspace requirements.
- Plans to provide for continuity of airspace control operations under degraded conditions.
- Description of the positive airspace control procedures for the Joint Force.
- Description of the procedural airspace control procedures available including requesting, approving, modifying, and promulgating procedures.
- Description of IFF/ SIF procedures
- Description of Orbit procedures
- Description of Special procedures
- Description of procedures and systems to compile and promulgate the Airspace Control Order (ACO).

AIR OPERATIONS DIRECTIVE (AOD)

5-39. The daily AOD gives Air Force planners the priority of effort, operational constraints and restraints and any other specific guidance governing the planning /execution of air and space operations during a particular ATO period. Airspace personnel need to review to get an overall view of what airspace requirements the ATO development may create, and to understand daily priorities for airspace deconfliction. Also, the AOD may have specific guidance reference airspace (i.e., plan for HVAA retrograde procedures due to threat). The AOD translates the JFACC'S JAOP into guidance for the planning and execution of a specific ATO.

AIR TASKING ORDER (ATO)

5-40. The Air Tasking Order (ATO) is the "OPORD" or mission assignment for all joint aircraft missions flown in theatre. This daily ATO document shows all missions operating in theatre and aircrews must ensure they are on this daily mission tasking prior to flight.

AIRSPACE CONTROL ORDER (ACO)

5-41. The Airspace Control Order (ACO) is developed after component commanders consolidate, deconflict, and forward their airspace requests to the ACA for further consolidation with other theater-wide inputs. The ACA then integrates all input, resolves any conflicts among the components, and prepares the ACO for distribution. The ACO implements specific airspace control measures for specific time periods. The ACO activates and deactivates procedural control measures, and updates positive control procedures. The ACO can be printed as a stand-alone document, or it can be incorporated into the ATO.

SPECIAL INSTRUCTIONS (SPINS)

5-42. In some theaters numerous airspace procedures and airspace usages are published in the SPINS. There may be one section that carries all the airspace procedures expected to be seen in an ACP. Other SPINS such as Tanker Procedures or Cruise Missile procedures also address airspace procedures within those particular sections. This may include Rules of Engagement and Combat Identification Criteria for Air Defense along with any additional guidance/directives/information that weapons system operators and/or aircrews will be held accountable for, i.e. LOAs, Host-Nation restrictions, Base Defense Zone (BDZ) procedures, and special weapons systems control procedures (ATACMS, UAs, TALCM/ALCMs, etc. SPINS are published as Baseline SPINS, Weekly SPINS, and Daily SPINS.

COMBINED/JOINT AREA AIR DEFENSE PLAN (AADP)

5-43. A prioritized list of friendly critical vulnerabilities are developed into a critical asset list and incorporated into the AADP. Defended Asset List (DAL) is the basis of the AADP, and active air defense operations are designated to protect these selected assets. The AADP should:

- Arrange a layered and/or overlapping defense to allow for multiple engagement opportunities.
- Include IO strategies for counterair.
- Contain detailed weapons control and engagement procedures integral to a joint counterair operation.
- Specify airspace control measures (ACMs).
- Include all surface-to-air capabilities assigned, attached, and supporting
- Provide for high value airborne asset (HVAA) protection.
- Employ EW to disrupt or destroy guidance systems.
- Integrate air and space- (aircraft), ground- (PATRIOT, SHORAD), and sea-based (AEGIS) capabilities.

5-44. The integration of air defense in the ACP is critical. The location of specific types of air defense operations and specific procedures for the identification of aircraft are critical to a viable ACP. The area air defense plan needs to be written with detailed engagement procedures that are consistent with the airspace control plan and operations in the combat zone. Drafters of the AADP must be cognizant of fielded equipment (and its possible limitations) employed by the joint/combined forces involved. Airspace control and area air defense operations need to be capable of functioning in a degraded MC environment. Detailed engagement procedures and the roles of subordinate commanders in decentralized execution of air defense operations are keys to success in a degraded environment.

OPERATIONAL TASKING DATA LINK (OPTASKLINK)

5-45. The OPTASK LINK lays down specifics of the data link architecture. The Interface Control Officer (ICO) monitors the data link nets to ensure transfer and display of critical air defense information. When directed, the ICO will transmit, via data link, engagement commands and air defense warning changes to linked agencies. The ICO coordinates the development of the OPTASK LINK message, and manages all Tactical Digital Information Link (TADIL) interfaces to create a consolidated air picture.

OTHER DOCUMENTS

5-46. The documents listed above are the minimum set of relevant airspace documents addressed by Joint and Service doctrine. Additional documents addressing airspace procedures or utilization could be available based on the command structure and operational environment. Operational orders and annexes often reference airspace issues in the fires, air defense and aviation annexes. Units often publish Helicopter Planning Guides (HPG) or Aviation Planning Guides (APG) as a companion document to the ACP and ACO. Civil aviation documents such as Notice to Airmen (NOTAM) and Aeronautical Information Publication (AIP) provide airspace information for civilian aircraft that often affect military operations.

AIRSPACE USERS

5-47. There are many airspace users in the air over the BCT AO. The ADAM/BAE must identify all users that will be operating in the AO and maintain situational awareness of all airspace users and plans within the AO. The following contains potential categories of users in the BCT airspace.

MOVEMENT AND MANEUVER

5-48. Aviation units can maneuver rapidly in the third dimension of the ground commander's operational environment to bring decisive combat power at the critical point and time. Using aviation units to enhance reconnaissance, provide security, and conduct attacks provides the ground force commander with positional advantage over his enemy, and increases the tempo of operations.

5-49. Army SOF units conduct special operations throughout the range of military operations. SOF, due to their mission profile, often operates beyond the normal areas of troop concentrations. Missions deep within enemy territory require the AMC system be capable of providing the necessary restrictive operational environment control measures to avoid fratricide.

5-50. Airborne units are subject to many of the same considerations of AMC as aviation and SOF. While in the air movement phase of the operation, airborne forces require airspace control measures to provide entry and exit routes for the aircraft that deliver forces to their predetermined locations. Airborne operations require restricted operations areas to deconflict airspace from all other aircraft not directly involved in the airborne operation. The ground phase of the operation requires substantial deconfliction of the operational environment.

INTELLIGENCE

5-51. Airborne platforms are used by maneuver commanders at all levels to gather intelligence. UAS conduct intelligence-collection and target-acquisition missions over the entire battlefield. Missions for UAS

at higher altitudes are included in the ATO/ACO. However, BCT UAS are not generally covered by the ATO/ACO. The AMC system must provide a real-time conduit to acquire airspace for immediate missions.

FIRE SUPPORT

5-52. FA uses airspace to deliver indirect fire support to maneuver forces across the entire area of the distributed battlefield. These indirect fires can traverse the airspace from extremely low to very high altitudes. All planned artillery fires are coordinated with other airspace users. However, not all targets can be identified and fires deconflicted in advance. In the close battle, fires of an unplanned, immediate nature in response to the actions of the maneuver forces, and the reaction by the enemy occur.

SUSTAINMENT

5-53. The BCT positions air ambulance units on the battlefield (depending on METT-TC) to provide CASEVAC support. The AMC system must provide the communications means needed to coordinate with the aircraft conducting the mission, as the aircraft may receive airspace clearance while it is in flight.

PROTECTION

5-54. AMD units located throughout the combat zone defend maneuver forces, vital airfields, logistics elements, and other critical assets as prioritized by the commander. AMD forces use both positive and procedural means of fire control for air battle MC. Close integration between airspace control, other airspace users, and air defense MC is imperative to ensure safe, unencumbered passage of friendly aircraft while denying access to enemy aircraft and missiles.

AMC PLANNING

5-55. The BCT includes AMC planning as a normal part of the operations process. When developing AMC, staff planners should keep the following considerations in mind.

- Limit AMC plans and control measures to only those needed to accomplish the mission.
- Maximize the use of procedural means of control.
- Ensure the plan supports the commander's intent and scheme of maneuver.
- Structure airspace control measures to facilitate recognition by ground forces and aircrew members.
- Avoid misunderstandings by keeping the plan simple.

5-56. The BCT AMC effort is led by the BAO and assisted by the ADAM/BAE section. The BAE generally represents Army aviation and UAS, the fires section represents fire support, the ALO or TACP personnel address USAF assets to include UAS and DCA, and AMD personnel from the ADAM represent ground based air defense fires.

5-57. When participating in MDMP, the BAO and his ADAM/BAE section prepare airspace plans to support the BCT scheme of maneuver. Timely airspace planning early is necessary due to the long lead times for requesting ACM. During COA development, the ADAM/BAE section develops airspace plans that support each ground maneuver COA. During COA analysis (war gaming), the AMC section modifies and synchronizes each airspace plan to support each ground COA. Once the COA is decided, the ADAM/BAE section conducts final integration of airspace requirements, and submits the necessary ACM to higher HQ for approval.

5-58. One of the goals of the planning process is to develop an order that clearly delineates what is to be done, how it will be done, who will execute each part of the plan and any special procedures that will be used. These considerations are equally important for airspace users and AMC procedures and must be addressed in the BCT OPORD and AMC annexes. Some of the critical AMC issues that the ADAM/BAE must address during the planning process are execution and risk.

AMC EXECUTION

5-59. The dynamic nature of battle means it will rarely proceed as planned. As the situation changes, commanders must make and disseminate decisions rapidly in order to take advantage of opportunities and synchronize subordinate and supporting actions. SA is a critical element in enabling the commander to make these rapid decisions.

5-60. The ADAM cell performs the critical task of developing and interpreting the air COP for the commander and staff. The air COP provides the commander the capability to visualize all airspace users' identification, location, flight paths, trajectories and other information critical to rapid decision making and risk mitigation. By knowing who is in the airspace, where they are going and what their mission is, the commander can quickly decide which mission to execute when there is an airspace conflict.

5-61. As in planning, the ADAM cell maintains constant communications with the FSE, ALO, S2, UA operators and all other staff elements that represent airspace users. This enables the ADAM to build complete SA and to synchronize ongoing airspace operations. By establishing these communication linkages, the ADAM cell personnel can often solve airspace user conflicts in real time by recommending adjustments to timing, trajectories or flight paths to the staff elements and subordinate HQs that control the conflicting users. This process is continuous and requires the ADAM cell to monitor not only the current operations, but also to project airspace usage for planned operations. The critical functions the ADAM cell must accomplish in order to provide SA and coordinate real-time deconfliction are:

- Resolve Real-Time Conflicts for Airspace Users within the Area of Operations.
- Determine Track Identification for Airspace Users.
- Manage Airspace Command and Control Information Displays.
- Process Airspace Orders and Directives.
- Monitor Assigned Airspace and Airspace Users within Assigned AO.

AMC RISK

5-62. *Risk management is the process of identifying, assessing, and controlling risks arising from operational factors, and making decisions that balance risk cost with mission benefits. (FM 5-19)*

5-63. Uncertainty and risk are inherent in all operations. Commanders cannot be successful without the capability of acting under conditions of uncertainty while balancing various risks and taking advantage of opportunities. Planning helps commanders reduce uncertainty and risk, providing the flexibility commanders need to conduct operations in complex, dynamic environments.

PLANNING

5-64. During the planning process, the commander decides how much risk to accept and includes risk guidance in his planning guidance to the staff. The staff uses the commander's risk guidance in developing control measures to reduce risk. The ADAM provides critical risk mitigation measures by ensuring all airspace users are synchronized with the scheme of maneuver and with all other airspace users. By employing procedural controls, sequencing and timing and establishing airspace priorities, the ADAM cell mitigates the risk of fratricide and enables rapid deconfliction of airspace users. Thorough AMC planning will mitigate risks associated with operations and require ADAM cell personnel to:

- Establish airspace utilization priorities that will enable rapid deconfliction and decision making.
- Establish ACMs or sequencing and timing that separate manned and unmanned aircraft, air defense and fires munitions and JIIM users to reduce potential for midair collisions.
- Develop communications plans and digital architectures that allow the BCT to rapidly share airspace information with all users enabling near real-time decision making and deconfliction.
- Publish AMC orders and annexes that address each of these areas and establish common procedures that all airspace users will follow.

5-65. Detailed planning mitigates risk by establish common procedures that all airspace users will adhere to. Additionally, the AMC annex details the processes used to integrate airspace users and circumstances of when to deviate from these procedures. By establishing this baseline of understanding, all decisions and actions will be governed by a common set of guidelines, allowing rapid decision making and mitigating risks from misunderstandings, uncoordinated actions and uninformed decisions.

EXECUTION

5-66. Employing forces without adequate planning and preparation significantly increases risk. However, delaying action while waiting for perfect plans, information and synchronization results in mission failure.

During execution, opportunity is fleeting and commanders must accept risk while minimizing hazards to friendly forces. In order to make informed risk decisions, commanders rely on their understanding of the operational environment. This understanding is a result of many factors, but is heavily reliant on SA developed from the COP. By developing SA and providing thorough analysis and recommendations, the staff enables the commander to make immediate decisions to capitalize on opportunities while simultaneously minimizing risk to his own force. As the provider of the air COP, The ADAM plays a critical role in developing complete SA in the BCT. Maintaining current and projected airspace user locations are essential to enabling immediate decisions for reactive fires, UAS employment, aircraft redirection and numerous other missions. When directed by the commander, ADAM personnel can redirect airspace users in order to prevent fratricide. In order to provide this level of information to the commander, ADAM cell personnel must:

- Maintain air COP to ensure commanders can employ assets without uncertainty of risk level
- Identify unknown airspace users to assist with air defense and prioritization of airspace utilization
- Redirect airspace users, when required, to reduce risk of fratricide when a higher priority mission must be executed[1]
- Monitor all airspace users in support of BCT operations to identify potential high risk situations and recommend alternate COAs before high risk occurs.

5-67. Additionally, it is critical that commanders and staffs understand their roles and authorities in the risk decision process. The ADAM cell must ensure that commanders understand that he is the final decision authority for mission execution and acceptance of risk. Frequently, commanders and staff believe that there is a requirement to "clear airspace" with the higher level controlling authority when executing immediate missions. While this may be specified in orders, there is no doctrinal or operational requirement to request permission to execute immediate missions. ADAM cell personnel must maintain SA that will allow the commander to make an inform decision and coordinate this decision with all affected airspace users and MC nodes.

5-68. While it is impossible to eliminate all risk from BCT operations, detailed planning, common, established procedures, good communications and thorough SA enable BCTs to implement controls to mitigate risks to all forces. Commanders can make informed decisions of when and where to shoot or fly without relying on guess work as to what the risk is. When combined with thorough planning, these execution tasks enable the BCT to employ all of its combat power at the decisive points of the battle without assuming unnecessary risk.

***Note1*:** Redirection of airspace users does not imply positive control of the airspace user. This is a seldom executed task and is primarily a risk mitigation action taken only in extreme cases in order to reduce the risk of fratricide.

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Appendix A

System Initialization

This appendix outlines how the user initializes each system safely. Often, there are multiple user log-ins, multiple choices presented to the operator for correct role/affiliation, and different ways to handle proper shutdown depending on the cause of the problem. For detailed information on how to execute these functions, the operator should consult the most current operator's manual and the operator's ADAM cell SOP.
The information in this appendix is a composite of checklists developed by the Central Technical Support Facility (CTSF), Fort Hood, the IBCT ABCS Training Support Packages (TSPs) and Training Division, TRADOC Programs Integration Office - Army Battle Command System (TPIO-ABCS). Body of Appendix—same as chapter, except for Main Heading Style

GENERAL INFORMATION

A-1. Initialization is a complex process requiring proficient operators and knowledgeable, involved leaders. This appendix assumes the ABCS architecture of the ADAM cell is on-hand and operational and that each system is loaded with the current software. If time and circumstances permit, you can initialize prior to deployment. Predeployment initialization also allows units easier access to external technical support. This provides you full interconnectivity as you enter the area of operations. Units, however, must nevertheless be technically self-sufficient to perform initialization tasks within theater following deployment. Prior to deployment, determine the following:

- Who are you (role name)?
- Who do you need to know (address book requirements)?
- Where are you (CP network address)?
- What version of software (BAS compatibility/functionality)?

Note: Having a detailed SOP and TTPs helps ensure your plan is complete and accomplishes your stated mission.

A-2. The CP server should **always** be first up and usually last down. The CP server provides—

- Information processing services to applicable clients within the CP.
- Forwarding capabilities for MC uni-cast messages originating from the TI.
- The CP entry and exit point for SU data coming from and going to the TI.

A-3. The CP server components are—

- Services.
- Network Time Protocol.
- Netscape Web Service.
- MC Registry.
- Distributed Computer Environment (DCE).
- Dynamic Host Configuration Protocol (DHCP).
- Domain Name Server (DNS).
- CP Boot Control Defense Information Infrastructure Common Operating Environment Kernel (DII COE KERNEL) Solaris Operating System (OS).
- MC Communications server

- Situational understanding.
  - COP (modules).
  - Live feed.
  - Blue agent.
  - EBC.
- Other components.
  - COP.
  - CMP.
  - Common Look and Feel.
  - Wireless Distribution System (WDS) (Send and Receive [SR] and Omni-Cast).
  - Security.
  - JCDB. Alerts.
  - JMTK/COP.

DEPLOYMENT PREPARATION

A-4. To place each ABCS in a state of readiness as per unit SOP in preparation for deployment, complete the steps listed in Table A-1.

Table A-1. Deployment Preparation Tasks

Actions	*Complete*
CMP	
Set up address books per unit SOP. Each address book should contain VMF and USMTF distribution lists.	
Clean out all old messages in the main message menu.	
Clean out all old messages in the message log.	
Verify the header defaults in the configuration menu.	
Using the JVMF free text and USMTF genadmin messages, develop the standard color reports that are used on a daily basis. Save each message.	
COP	
Develop the following map areas for Kosovo and save them. Use the following information to develop these areas: • Center: 34TCL7848877861, Scale: 1:C00,000, Name: Xhafzotaj_1-C00. • Center: 34TDM1774106960, Scale: 1:2C0,000, Name: Burrel_1-2C0. • Center: 34TDM778C773C64, Scale: 1:2C0,000, Name: Prizren_1-2C0.	
Develop the required chart tabs per unit SOP; place a map type on each tab and save the tabs.	
Develop any new graphical or unit pallets that are needed per SOP.	
Develop any blank notional overlays that will be used during an operation. These should be developed per unit SOP. (At this time these overlays are blank and portions of the naming convention will be blank. Once information is placed on these overlays, they can be renamed to reflect the current operation.) Save each overlay.	
Develop a CP picture with at least two CP overlays that will display friendly blue unit centers of mass from the JCDB for your unit. This should be a unit SOP item.	
Develop another CP picture that will display friendly blue unit centers of mass from the JCDB that need to be tracked by your unit.	
Develop a CP filter to display the correlated red picture from the JCDB.	

Table A-1. Deployment Preparation Tasks (continued)

Actions	*Complete*
COP (continued)	
Develop locations in the above map areas using the Gazetteer.	
Set the declutter tool to display only company and higher units for the live blue feed.	
Plan Manager	
Delete all old orders, overlays and UTOs from the plan manager.	
Map the network drive to plan manager.	
UTO	
Construct the base line UTO.	
MCS-L	
Perform the CMP tasks.	
Perform as many of the CTP/COP tasks as possible.	
Perform the Plan Manager tasks.	
ASAS-L	
Perform those tasks that can be accomplished on the ASAS.	
Perform all the CTP/COP tasks.	

ABCS INITIALIZATION

A-5. Figure A-1 provides a graphical depiction of this process. The remainder of this appendix provides the necessary checks for leaders to ensure proper initialization of the system.

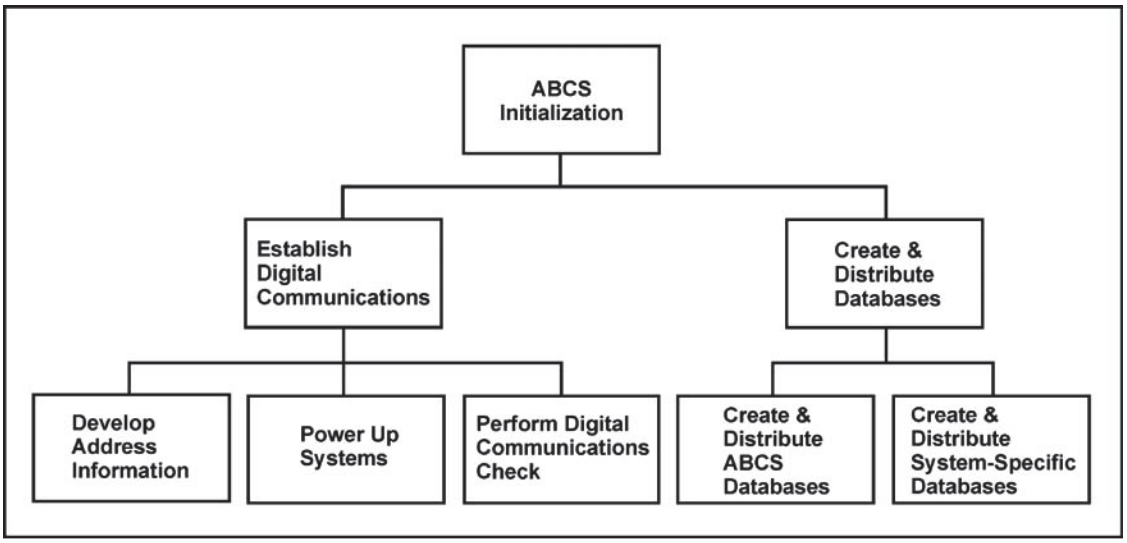

Figure A-1. Initialization process

A-6. To establish digital communications, you must develop address information, power up the ABCS, and perform digital communications checks between systems. The initialization process is divided into two steps:

- Establish Digital Communications.
  - Develop address information (paragraphs A-8 through A-14).
  - Power up systems (paragraphs A-15 through A-20).
  - Perform digital communications checks (paragraphs A-21 and A-22).

- Create and Distribute Databases.
  - Create and distribute ABCS databases (paragraph A-23 through A-25).
  - Create and distribute system specific databases (paragraphs A-26 through A-32).

A-7. Table A-2 provides a checklist of preliminary tasks required to continue the process.

Table A-2. Initialization Preliminary Tasks

Preliminary Tasks	*Complete*
Task: Verify ATCCS capability for achieving an operational state.	
System hardware correctly assembled.	
CP LAN connections established.	
Communications system in place.	
External power established.	
Task: Determine Battle Staff ATCCS start sequence for CP operations.	
Identify CP/cell server.	
Identify any unique ATCCS client start considerations for correct integrated CP operations.	
Task: Correctly initiate/complete ATCCS start sequence.	
Initiate system start. Correctly make all required operator input to aid system initialization process.	
Log ATCCS onto CP LAN.	
Task: Prepare ATCCS to initiate/conduct operations.	
Verify system operational capability.	
Verify minimum network connectivity achieved for operational requirements.	

DEVELOP ADDRESS INFORMATION

A-8. To develop address information, each system in the network must be identified. In turn, it must be determined which systems must communicate with one another and by what means. To communicate within your CP, you must make sure your router is configured with the correct IP addresses used in your address book for your cell nodes. You can use the MCS DCE cell organization tool to see others with whom you can communicate outside your CP.

A-9. The UTO specified in the OPLAN is the start point for determining address information. Using the UTO and the MTOEs for the listed units, each ABCS is located and identified by function and unit. In turn, this defines the types and numbers of workstations, their users, and their locations. This defines the ABCS architecture.

A-10. The UTOs, MTOEs, and the ABCS architecture diagram are used together to develop the tactical communications diagram (TCD). The TCD is developed by the S-6/G-6 and is a schematic depicting the workstations and their interconnections (for example, via jump boxes or routers). Jump boxes are used when two workstations are collocated and information is routinely transferred between them for continuous processing and distribution (for example, between an FBCB2 and MCS workstation). The TCD helps to define the flow of information and to develop the table of addressees. A unit's previous versions of its TCD are useful in developing the TCD for the current OPLAN.

A-11. The CP Architecture Diagram (developed by the S-6/G-6) is developed from the TCD. The CP Architecture Diagram shows a CP's hardware and connections to include routers, LENs, and SENs. As

with the TCD, previous versions of a unit's CP Architecture Diagram are useful when developing the diagram for the current OPLAN.

A-12. The Horse Blanket is a product developed under the auspices of Director of Information Systems for Command, Control, Communications and Computers (DISC4). The S-6/G-6 provides input about his unit's net/sub-net structure information in the development of the Horse Blanket. It merges all the TCDs and CP Architecture Diagrams of a unit to show the full picture. It depicts a unit's entire ABCS capability by showing its every workstation and the communications systems that interconnect them. As with other diagrams, previous Horse Blankets, TCDs, and CP Architecture Diagrams can be used to develop the Horse Blanket for the current OPLAN.

A-13. The Information Exchange Plan (IXP), established by the S-6/G-6, shows the routine flow of information among CPs. In essence, it describes who is to communicate with whom. It also shows what messages and reports must be sent to ensure timely distribution of critical information. The IXP is developed using the Horse Blanket and the TCD.

A-14. The development of address information should culminate in the Address Book. The Address Book lists each ABCS machine within the unit's architecture along with the information shown below. Information from the IXP, TCD, and Horse Blanket plus previous Address Books is used to develop the Address Book for a current OPLAN. When adding a new Address Book, always first delete the dan_resume file (do not reinitialize the system). Address Book information contains—

- ABCS machine.
- IP address.
- Unit Identification Code (UIC).
- Unit name.
- Role.
- Host name.
- Machine name.
- Cell name.

POWER UP SYSTEMS

A-15. The next step in establishing digital communications is to power up the ABCS. This step involves two actions, preparing the ABCS and powering it up. Preparing to power up the ABCS involves the preparation of these items:

- Vehicles.
- Power source.
- Cables.
- Other equipment.
- Power setup.
- SICPS shelters.
- Information displays.

A-16. Vehicles must be placed into position, and their antennas must also be correctly connected. All grounding wires should be tightly bound to their grounding stakes, and the stakes themselves firmly placed in the ground. Identify the electrical power source. If generators are used, they should be properly connected and grounded. Power cables should not be broken or frayed. Generator voltage and phase settings must be correct, and sufficient fuel must be on-hand to ensure continuous power.

A-17. The SICPS must be correctly set up to support ABCS power up. Verify that the required alternating current (AC) and direct current (DC) circuit breakers and switches are on. Every uninterruptible power supply (UPS) must be turned on and working properly and router indicator lights should show proper activity. The ECU should be operating and set to the desired function, whether circulation, heat, or air-conditioning. The particulate filter should be activated, if required. Ensure hard drives are seated and

locked into place and that the ABCS computers are plugged into the UPS; however, never plug a printer into the UPS. LAN "T" connectors and terminators should be properly installed as well as LAN cables.

A-18. Key information should be on-hand or identified. This includes the CP Architectural Diagram. Ensure servers have been identified for the DCE cell and each BAS. Also check to verify each computer has key information such as its IP address, host name, originator/recipient (O/R) name, and role.

A-19. After these preparations, ABCS and its supporting systems are ready for power up. The power up sequence is critical and must be carefully executed and supervised. Check to ensure all communications equipment is functioning. Use Table A-3 as a template for tracking preparatory procedures.

Table A-3. Prepare to Power Up

Actions	*Complete*
Vehicles	
Vehicles are in position.	
Antennas are properly connected.	
Vehicles are properly grounded.	
Generators/commercial power source.	
Power source is properly located.	
Power source is properly connected.	
Generators are grounded.	
Adequate Class III is on-hand to fuel the generators.	
Cabling	
LAN "T" connectors and terminators are properly installed.	
LAN cables are properly installed and not broken or frayed.	
Other Equipment	
Monitors are properly connected.	
Keyboards are properly connected.	
UPSs are properly connected.	
Verify Power Setup	
Power cables are properly installed and not broken or frayed.	
Generators are operating.	
Voltage and phase settings are correct.	
Standardized Integrated Command Post System (SICPS) Shelters	
Required AC circuit breakers and switches are on.	
Required DC circuit breakers and switches are on.	
UPSs are on and working properly.	
ECU is set for desired function (circulation, heat, or A/C) and is working properly.	
Particulate filter is activated, if required.	
Router indicator lights show proper activity.	
Verify LAN diagram is on-hand and accurate.	
Verify DCE cell server is properly identified.	
Verify BAS servers are properly identified.	
Verify each computer has necessary key information (IP address, host name, O/R name, role).	

A-20. Use Table A-4 as a checklist for tracking power-up procedures.

- The power-up sequence is critical and must be carefully supervised and performed.
- All ABCS computers on the LAN must be set to the same time (+/- 3 minutes of each other).

Table A-4. Power Up the ABCS

Equipment	*Complete*
Communications Equipment	
SINCGARS	
SINCGARS (SIP) with INC (start before FBCB[2])	
EPLRS	
AN/PSC-7	
AN/GRC-193	
AN/GRC-213	
Frequency hopping multiplexer (FH MUX)	
Precision lightweight GPS receiver (PLGR)	
Intercom, MESHNET, VIC-3, or VIICS x/VNR	
Criterion Decision Plus (CDP) modem	
GBS BADD	
MSE	
MSE telephones	
Commercial telephones	
LAN router	
Tactical end-to-end encryption device (TEED)	
Wireless LAN	
FAX	
Video switch	
CNN receiver	
Other Equipment	
ATM/VTC	
Printer	
Large screen display	
ABCS computers	
DCE cell server	
BAS servers	
BAS clients	

PERFORM DIGITAL COMMUNICATIONS CHECKS

A-21. The final step in establishing digital communications is to perform a digital communications check with required hosts. The operator should attempt to contact or "ping" each host on the LAN. If there is a ping failure, contact the LAN manager and troubleshoot the problem. Next, verify connectivity within the WAN by pinging a small number of hosts in other sections. If you get a failure, contact the WAN manager. If you cannot communicate from one BAS to another (for example, from ASAS to MCS), check the following:

- Host name.
- ATCCS alias (must be an exact match).
- IP address.

A-22. Use Table A-5 as a checklist for tracking connectivity procedures.

Table A-5 Establish Digital Communications

Action	*Complete*
Ping all hosts within the LAN.	
Troubleshoot LAN ping failures (contact the LAN manager).	
Ping from multiple hosts on the LAN to identify malfunctioning host.	
Verify connections and LAN terminator plug on suspect host.	
Use LAN analyzer to locate fault.	
Ping a minimum number of hosts in other cells to verify WAN connectivity.	
Troubleshoot WAN ping failures (contact the manager).	

CREATE AND DISTRUIBUTE ABCS DATABASES

A-23. The next step is to create and distribute the required databases. These include ABCS common databases and those required by individual systems. The ABCS common databases are those shared across the BASs. The information depicted in the COP will vary according to the unit's needs as determined by the commander. The COP is normally established on an MCS machine in the CP. Use Table A-6 as a checklist for tracking database distribution procedures.

Table A-6. Track ABCS Database Distribution

Action	*Complete*
MCS	
Each MCS system administrator enters appropriate Auto-Send Rule.	
Each MCS system administrator enters appropriate Auto-Forward Rule.	
AFATDS	
The Master Unit List (MUL) is built.	
The AFATDS unit name and ID are added to the MUL.	
The current situation database is built.	
The communications database is built.	
Databases are distributed appropriately.	
BCS[3]	
Corps G-4 operator inputs UTO and distributes.	
Corps G-4 inputs and distributes status on the following: • Class V • Class VII • Class IX • Personnel • Maintenance	

Table A-6. Track ABCS Database Distribution (continued)

Action	*Complete*
BCS³ (continued)	
Network configuration table is defined.	
Media selection table is defined.	
Media selection table is defined.	
MHTs are defined	
Named distribution list is defined	
Continuous operations (CONOPS) table is defined.	
ASAS	
All operators create the aliases and normalization (Dante) table.	
All operators perform UIC/URN mapping.	
All operators perform map symbol mapping.	
All operators create the GeoReference table.	
AMDPCS	
Operators at every level enter appropriate ADA asset locations.	
Operators at every level enter appropriate AD control measures.	
All operators create distribution lists for the following reports: • E500—Air Early Warning Message. • S201—Support Battlefield Geometry. • S507L—Resource Report (Location). • S507R—Resource Report (Resources).	
FBCB²	
Operators perform UIC/URN mapping.	
Unit personnel input status and forward up chain of command on the following: • Class I • Class II Clothing Equipment • Class II Supplies • Class III Bulk	
DaVinci (Replacement for BPV)	
Friendly information is entered: • Friendly UTO. • Unit UICs, name, echelon, subordination and location. • Number and type of weapon systems. • Range of weapon systems. • Comparative combat effectiveness values. • Number of dismounted infantrymen or engineers. • Number of vehicles/trailers by type.	

Table A-6. Track ABCS Database Distribution (continued)

Action	*Complete*
DaVinci (Replacement for BPV) (continued)	
Enemy information is entered: • Enemy UTO. • Number and type of weapon systems. • Range of weapon systems. • Comparative combat effectiveness values. • Number of dismounted infantrymen/engineers. • Number of vehicles/trailers by type.	
Barrier/mobility materiel status is entered: • Quantity of mines by type. • Amount of concertina. • Quantity of mine-clearing line charge (MICLIC).	

A-24. Commander's Tracked Item List—

- Enables the commander and staff to stay informed on the status of key information.
- Is developed from the baseline resource list (BRL).
- Is transmitted from BCS3 to company level via FBCB2 using the K07.06 message.
- Is typically forwarded by the company first sergeant or executive officer for the unit via FBCB2 to battalion BCS3 which, in turn, forwards it up the chain to the CTIL originator (usually brigade).

A-25. Friendly Unit Locations—

- Are generated at the lowest level.
- Are automatically entered from the platform level into FBCB2 and transmitted up the chain through EBC which provides a continuous live feed to the JCDB.
- Are consolidated at each MCS server and are automatically fed to all client MCSs. Each echelon consolidates the information and sends it to higher, lower, and adjacent units.
- Will change every time an FBCB2 platform moves more than 100 meters, or every 10 minutes if it remains stationary, or every time the handset on a SINCGARS radio is keyed. If operating with an analog unit, that unit's information must be entered manually.

DISTRIBUTE SYSYEM SPECIFIC DATABASES

A-26. The final step in initialization is creating and distributing databases specific to each system. MCS operators input the Auto-Send and Auto Forward Time Rule Name (TRN) information. This enables MCS to automatically create USMTF messages to those they designate. To develop the list, use the DCE cell's organization tool.

A-27. AFATDS operators must build the master unit list (MUL). They add the AFATDS unit name and identification to the MUL. Operators must also build the Current Situation and Communications Databases.

A-28. BCS3 operators must be provided the following information from their supervisor (who can obtain it from the S-6/S-3 section) and enter—

- Network Configuration Table.
- Media Selection Table.
- MHTs.

- Named Distribution List.
- CONOPS Table.

A-29. The BCS3 operator at corps G-4 receives the MCS UTO and inputs the data. The UTO is then distributed via BCS3 channels throughout the corps. Table A-7 shows BCS3 database items and their means and source for updating.

Table A-7. BCS3 Database Items and Updates/Source

BCS3 Database Items	*Update Method/Source*
Class I	Manual, FBCB2
Class II Clothing/Equipment	Manual, FBCB2
Class II Supplies	Manual, FBCB2
Class III	Manual, F FBCB2
Class V	Automated SARSS, Manual, FBCB2
Class IX	Automated SARSS, manual, FBCB2
Personnel	Automated SIDPERS, manual, FBCB2
Maintenance	Automated SIDPERS, manual, FBCB2
Medical	Manual, feed from TEMS
Transportation	TC ASCII

A-30. ASAS operators at every level must create—

- Aliases and Normalization (Dante) Table.
- Geo-Reference Table.
- Perform UIC to URN mapping and map symbol mapping.
- FBCB2 operators must complete UIC/URN mappings.

A-31. AMDPCS operators are responsible for—

- Populating the database with ADA asset locations.
- Air defense control measures.
- Distribution of this information by the appropriate messages.

A-32. DaVinci (if fielded) is used at division and corps to assist in COA analysis and war gaming. The DaVinci must be loaded with the following:

- U. S., coalition, enemy, and neutral forces.
- UICs, name, echelon, subordination, and current location.
- Number, types, and ranges of weapon systems.
  - Comparative values for unit combat effectiveness.
  - Number of dismounted infantrymen and engineers.
  - Number of vehicles and trailers by type.
- Barrier/Mobility Material.
  - Quantity of mines by type.
  - Amount of concertina.
  - Quantity of mine clearing mine charge (MICLIC).
- Army common message processor (CMP). CMP is a messaging (USMTF, joint variable message format (JVMF)) engine used by ABCS. Messages are generated from the database or from templates. Using the MHT, the system administrator and/or operator determine how

messages will be actioned, whether by the user or automatically by the system. The operator can create a Name Distribution List (NDL) for dissemination of messages to multiple addressees.

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Appendix B

ADA/AVN Systems Augmentation

The BCTs do not have organic air defense artillery weapon systems. The BCT does have an organic air defense airspace management (ADAM) cell. The ADAM cell is equipped with an air and missile defense workstation, an air defense system integrator (ADSI), and forward area air defense command, control, and intelligence processor. This appendix details the ADAM cell capabilities and operational functions. It also describes AMD and aviation augmentation, with a list and general description of AMD and aviation assets which the maneuver commander may task for operations.

CAPABILITIES

B-1. Upon contingency notification, the ADAM cell conducts an assessment to determine if AMD augmentation from the division AMD battalion is required. The ADAM cell conducts continuous planning and coordination proportionate with the augmented sensors deployed within the brigade's AO. The ADAM cell and tailored AMD augmentation force provide the active air defense over the brigade's distributed force operations in an uncertain and ambiguous battlefield environment. The ADAM cell is integrated within the BCT operations center and always deploys with the brigade.

OPERATIONAL FUNCTIONS

B-2. The ADAM cell conducts air defense and airspace analysis, coordinates the AMD augmentation into the integrated air defense system (IADS), and performs airspace management and control.

- **AMD Analysis**. The ADAM cell conducts a supporting METT-TC analysis. Upon completion of this initial analysis, the BCT commander is briefed and, if required, approves the request for air defense augmentation from higher.
- **Coordination of AMD Augmentation**. Coordination for deployment of the recommended AMD augmentation force runs concurrently with the AMD METT-TC analysis. Depending upon force availability (exclusion area boundary [EAB] AMD assets already deployed in the AO), the ADAM cell staff identifies AMD augmentation force requirements and their availability for rapid deployment. It then integrates this information into the AMD force composition recommendation to the BCT commander. Upon approval from the BCT commander, the AMD issues a warning order to the selected AMD augmentation force and integrates its deployment within the BCT deployment scheme.
- **Integration of AMD Augmentation**. The ADAM cell orchestrates the employment of the AMD augmentation force to establish optimal surveillance and defense of the brigade's maneuver forces and/or designated high value assets (HVAs) throughout the mission. The ADAM cell provides the BCT commander and staff with the aerial component of the overall COP. As the operation evolves, the ADAM cell works continuously with the BCT staff to ensure the commander's intent is executed with respect to the aerial COP and defenses. The ADAM cell continuously monitors the AMD situation and conducts continual METT-TC analysis to achieve situational understanding of the third dimension in both friendly and enemy perspectives. The ADAM cell integrates into the IADS through direct coordination with EAB air defense coordinators and the BCD collocated with United States Air Force (USAF) area air defense commander.
- **Airspace Management and Control**. The ADAM cell receives and distributes the relevant data from the ACO and air tasking order (ATO), interpreting and displaying the procedural airspace control means (for example, corridors and restricted operations zones) and scheduled

friendly air operations that may impact upon BCT operations. Additionally, the ADAM cell develops recommended airspace control means supportive of BCT operations and forwards them to the ACA for approval and implementation. In all AMC actions, the ADAM cell coordinates existing and proposed airspace control means with all elements of the BCT force employing aerial assets (for example, Army aviation, friendly force UAS, and artillery).

B-3. Divisional AMD/AVN battalions can support the BCT. If the BCT requires some level of internal AMD/AVN support, the divisional AMD/AVN battalion is notified and is tailored as an augmenting AMD/AVN force that will deploy with the BCT. Dependent upon the threat and level of protection required, the tailored package may consist of anything from a platoon-sized Sentinel/shooter mix to an entire ADA BN (P/A).

B-4. Some augmented assets will be immediately available and others not until later due to ongoing missions. Depending on augmented asset availability and AMD/AVN assets already deployed in the AO, the ADAM cell identifies AMD/AVN augmentation force requirements. In any event, the augmenting AMD/AVN forces most likely will be unfamiliar with BCT-type operations, and therefore will be heavily reliant upon the ADAM cell to assist with integration, synchronization, and employment planning. The ADAM cell begins planning the optimum defense when the brigade receives AMD/AVN augmentation approval. The capabilities of the AMD package must be considered. It evaluates the ability to pass digital EW to the shooters; analyzes possible methods of control; and ensures that employment plans support the commander's scheme of maneuver and adequately protect priority assets.

B-5. The ADAM cell plans and coordinates the movement of the AMD/AVN augmentation. It coordinates with joint and combined forces to integrate AMD/AVN into brigade operations. The ADAM cell evaluates and determines the size, plans, and coordination of the AMD/AVN augmentation requirements by performing steps as described in Table B-1.

Table B-1. Augmentation

Determining ADA/AVN Augmentation Requirements
Analyze the employment of AMD shooters and sensors for adequate EW of enemy air activity and IPB-predicted AAA.
Determine the operational status of AMD/AVN units, personnel, and shortages that may affect operations.
Identify any missile or personnel weapon ammunition requirements.
Recommend the flow of force for AMD/AVN assets; initial employment of AMD/AVN assets to secure a lodgment, as well as for its expansion; identify the appropriate command and support relationship of the augmenting force package; and determine force closure.
Plan deployment and integration of AMD/AVN assets into the force; coordinate with S-3 on integration of AMD/AVN assets into maneuver plan; and coordinate with S-6 on integration of AMD/AVN assets into established AMD/AVN C^4I architecture.

The ADAM cell OIC will coordinate with the S-2 on integration of AMD EW assets into the reconnaissance, surveillance, and target acquisition plan, and assist in determining communications and data links with the joint/combined forces and those AMD EW assets.

AMD AUGMENTATION

B-6. During the course of a mission or operation planning, the BCT may determine that they require AMD weapons systems augmentation. The following is a listing and general description of those AMD assets which the maneuver commander may task for operations dependent upon METT-TC considerations.

COUNTER-ROCKET, ARTILLERY, AND MOTAR (C-RAM)

B-7. C-RAM is a system-of-systems (SoS) effort that seeks to provide a counter-rocket, artillery, and mortar capability to an operating base. It is a holistic solution that encompasses the following seven tenet elements: deny, sense, warn, shape/respond, intercept, and protect through the integration of command and control. It provides real and near-real-time sensor data to the commander and staff. It presents a common interface for battlefield sensors, communications system networks, wireless audio visual emergency system (WAVES), and responder assets through the use of a combination of outdoor speaker posts, indoor speakers, and lights provide the warning to personnel, which enable commanders to shape the battlefield through the use of modeling tools. C-RAM provides intelligence and targeting information to support field commanders in countering enemy tactics and features open software/hardware architecture and Windows operating environment designed to support fast and efficient user management, processing, display, recording, and dissemination of data. The expected evolutionary growth and development of C-RAM allows for the incorporation of enhanced capabilities, additional sensors, new technology, and advanced operator functions. It provides soldier(s) a greatly enhanced, highly automated capability to receive, process, manipulate, retrieve, and display data (from sources throughout theater) in real and near-real-time to satisfy the commander's operational requirements.

B-8. Battery-based units consist of a battery headquarters, a motor maintenance section, a MC section, a sensor section, and three C-RAM intercept platoons.

B-9. Platoon-based units will consist of a platoon headquarters, an engagement operations section, and one or two Phalanx sections.

AVENGER

B-10. An inner-tier system, the Avenger weapon system is a lightweight, day or night, limited adverse weather fire unit (FU) employed to counter low-altitude aerial threats. The FU consists of two turret-mounted standard vehicle-mounted launchers (SVMLs), a machine gun, a forward looking infrared (FLIR) sight, a laser range finder (LRF), and an IFF. The gyro-stabilized turret is mounted on a HMMWV. The FU can launch a missile or fire the machine gun on-the-move or from a stationary position with the gunner in the turret. It can also be remotely operated from a location up to 50 meters away. Onboard communications equipment provides for radio and intercom operations.

SENTINEL

B-11. The Sentinel platoon consists of three Sentinel radar sections, two Sentinel teams per section. Teams normally work in pairs when deployed. These sections make up the FAAD C3I architecture of the Sentinel platoon. The digitized Sentinel/MC node is capable of 24-hour operations and can be located within 10 kilometers of the forward line of own troops (FLOT). It should have a clear field of view (360 degrees), no more than 60 kilometers from another Sentinel radar to ensure overlapping coverage (20-kilometer radar overlap), and should be placed away from power sources of similar radiating frequency bands to avoid interference. If two digitized Sentinel nodes must operate close together due to the mission, then one should counter-rotate to ensure no radar interference exists between them.

SLAMRAAM

B-12. An outer-tier air defense system, the Surface-Launched Advanced Medium-Range Air-to-Air Missile (SLAMRAAM) weapon system supports a variety of missions at the tactical, operational, and strategic levels of warfare including dominance, control, and exploitation of the Army, and force aerial operational environment. Platoons protect U. S., multinational and coalition forces, and civilian population centers, as well as critical military and geopolitical assets from air and missile attacks. The platoon can be integrated into maneuver forces or placed in a defensive over watch role of stationary or static assets during both defensive and offensive operations. The platoon ensures vertical and horizontal freedom of maneuver to the force commander. SLAMRAAM will also enable shaping, and decisive and sustaining operations.

B-13. SLAMRAAM platoons are part of SLAMRAAM batteries assigned to AMD battalions that are equipped with Patriot firing batteries. SLAMRAAM assets are incorporated into the air defense plan and can be collocated with Patriot to provide 360-degree defensive coverage of Patriot dead zones while other SLAMRAAM sections travel with the maneuver forces. SLAMRAAM is envisioned to be the initial kinetic energy (KE) weapon system for the Army's Enhanced Area Air Defense System (EAADS).

PATRIOT

B-14. A lower-tier air defense system, the mission of Patriot is to protect the forces and selected geopolitical assets from aerial attack, missile attack, and surveillance. Patriot provides protection against TBMs, air threats for critical assets in the corps, and theater areas. Patriot can be tailored to the tactical situation in defending against air and missile attack.

JLENS

B-15. An outer-tier air defense system, JLENS supports the joint theater air and missile defense (JTAMD) mission set that consists of three operational elements: offensive counter air (OCA) operations, defensive counter air (DCA) operations, and JTAMD communications system. JLENS directly supports all facets of active air defense and contributes to OCA/attack operations and communications system through multilink dynamic data distribution. JLENS supports the execution of the JTAMD mission set by providing surveillance, integrated fire control (IFC) support, and aerial combat identification (CID) support. JLENS is a major contributor to the JTAMD capstone requirement document (CRD) objectives of SIAP and CID. The contribution includes precision tracking and measurement information. JLENS also supports a variety of additional missions by virtue of its inherent capabilities and/or elevated location. These missions include—

- Detection and tracking of surface moving targets (SMTs).
- Tactical ballistic missiles/large caliber rockets ascent phase detection, tracking, and determination of a launch point estimate.
- Communications range extensions by using the elevated platform to overcome terrain restrictions associated with ground-based LOS communications. JLENS can be used to defend the United States and protectorates in critical areas against attack from cruise missiles (CMs), and other hostile aerial objects.

THAAD

B-16. The THAAD system provides rapidly deployable ground-based missile defense components that deepen, extend, and complement the Ballistic Missile Defense System (BMDS) capabilities to combatant commands. It defends against all short-range ballistic missiles (SRBMs) and medium-range ballistic missiles (MRBMs) in endo- and exo-atmosphere. THAAD uses JTIDS/Link 16, ACUS, STE, and AN/PSC-5 SATCOM (Voice Early Warning) to interface with Army and joint forces. The regionally focused command and control headquarters has THAAD as an asset. This system is expected to be a division, corps and Army deployable asset.

MEADS

B-17. An outer-tier air defense system, this system is in development. It is envisioned that scalable Medium Extended Air Defense System (MEADS) batteries will provide a mobile, 360-degree ATM capability to shield the vertical entry force or critical assets, destroying ballistic missiles (BMs) and cruise missiles (CMs) at long range and allowing preferential engagements over less critical areas. While MEADS batteries can operate independently with the joint ID and engagement authority, they will usually be employed under the battle command (BC) of an AMD task force (TF) TAC. MEADS batteries can be configured with anywhere from 1 to 12 launchers as required, and AMD TFs can accommodate one or more MEADS batteries. Because MEADS will rely on external elevated sensors and IFC to support extended range intercepts, mobile AMD TFs and MEADS batteries must develop habitual relationships with these external sensors including JLENS.

EAADS

B-18. Projected scalable Enhanced Area Air Defense System (EAADS) batteries will include outer-tier and inner-battle elements. The EAADS Block 1 outer-tier system leverages SLAMRAAM, using a tri-service missile. The EAADS inner-tier battle elements will complement precision attack and counter fire capabilities by providing defenses against RAM. The EAADS inner tier will also have direct fire capability for self-defense and support of maneuver forces when and where appropriate.

AIR AND MISSILE DEFENSE BATTALION

B-19. The AMD battalion provides critical air and missile defense coverage and timely early warning to maneuver units and multiple defended assets across the operational environment, allowing freedom of maneuver and operations in a joint tactical environment. The AMD battalion consists of four Patriot firing batteries with six launching stations each, an Avenger battery with six Sentinel radars and 24 Avenger fire units controlled by the AMD battalion fire control center (FCC). The FCC provides an effective and versatile combination of system capabilities with 360-degree coverage for a seamless air and missile defense while enhancing protection capabilities. Voice and data communications (both internal and external/joint) are accomplished with TADIL-J, TADIL-B, PADIL, EPLRS, and SINCGARS. Due to the increased number of radars and weapon systems and the need for an additional MC center, the FCC is necessary to effectively manage the air battle and conduct friendly protect operations. The AMD battalion FCC is where integrated, net-centric engagement operations are conducted and engagement commands are directed to specific weapon platforms for rapid target prosecution and effective fratricide risk mitigation and prevention. Organic to the AMD battalion is a maintenance company that provides both direct and organizational support. The organization will provide leaders that are oriented towards fighting air and missile battles in the joint operational environment.

AVIATION AUGMENTATION

B-20. During the course of a mission or operation planning, the BCT may determine that they require AVN augmentation. The following is a listing and general description of those AVN assets which the maneuver commander may task for operations dependent upon METT-TC considerations.

B-21. The augmented aviation unit assigned to support the BCT will coordinate with the Army's first MTOE "brigade level" AMC officer. This officer will function as an advisor to the BCT commander on integration of Army aviation—capabilities and limitations of the supporting unit; the process for requesting aircraft missions and plan; and prepare and execute AMC. The following paragraph will provide information on what the aviation unit will bring to the fight.

B-22. Aviation augmentation from division or higher is required to expand the BCT's ability to shape its operational environment and conduct decisive tactical operations in a major theater war. It may be required in stability and sustainment operations and smaller scale contingencies. Aviation augmentation will include attack, reconnaissance, and lift elements, incorporated within an aviation task force package. Aviation augmentation will operate in the potential roles of: task force HQ Company (-) with AH-64D, three platoons, one assault platoon of UH-60L; one SCT platoon of OH-58D; or one military lift platoon with CH-47D. Table B-2, is a list of types of aviation support provided.

Table B-2. Aviation Support

Types of Support
General support/lift.
Aerial resupply (including forward arming and refueling points).
Casualty evacuation.
Air movement.
Attack aviation/air ground integration route security close air support/joint air attack team-shaping operations (mass, deep, flanks) and air cavalry operations.
Zone reconnaissance.
Screen/operational control to reconnaissance, surveillance, and target acquisition.
Assault aviation.
Quick-reaction force.
Limited air assault (company level and below aviation task force package may be a company [-] that includes TF HQ of AH-64D, air assault platoon/detachment UH-60L, scout platoon/detachment OH-58D, and a military lift CH-47D).

TYPES OF SUPPORT

B-23. General support/lift. Aerial resupply (including forward arming and refueling points). Casualty evacuation. Air movement. Attack aviation/air ground integration route security close air support/joint air attack team-shaping operations (mass, deep, flanks) and air cavalry operations. Zone reconnaissance. Screen/operational control to reconnaissance, surveillance, and target acquisition. Assault aviation. Quick-reaction force. Limited air assault (company level and below aviation task force package may be a company [-] that includes TF HQ of AH-64D, air assault platoon/detachment UH 60L, scout platoon/detachment OH-58D, and a military lift CH-47D).

Appendix C

Liaison

This appendix describes the importance of liaison. It identifies the key staff sections with which the ADAM cell crew must establish liaison to accomplish its tactical mission.

GENERAL

C-1. Establishing a liaison with higher and sister headquarters has always played an important role in military staff operations. These face-to-face meetings develop relationships that help foster communications, preserve freedom of action, and maintain flexibility. Liaison also ensures that the BCT, along with adjacent commands, remains aware of respective tactical situations by providing them with exceptional, critical, or routine information; verification of information; and clarification of operational questions. Liaison teams can also provide a digital communications link and COP to analog units that are not equipped with a comparable ABCS capability.

FIRE COORDINATION CELL

C-2. The fires coordinator (FCOORD), normally the assigned FA battalion commander, leads and directs the fires coordination cell. Through his staff, the FCOORD plans, coordinates, integrates, and synchronizes all fires activities in support of BCT operations. For this reason, the ADAM cell OIC must coordinate with the FCOORD to ensure that SU and SA remain current. In addition, the FCOORD knows the commander's guidance for desired effects and the purpose of targeting specific targets, as well as the commander's scheme of fires. He advises both the BCT commander and his staff on the capabilities and employment of lethal and nonlethal weapons. When away from the TOC, the FCOORD can remain linked to the FSC via the AFATDS terminal mounted in the brigade commander's armored vehicle. This enables the FCOORD to execute the BCT commander's guidance for fires and effects even when away from the FSC.

JOINT INTERFACE CONTROL OFFICER

C-3. The JICO serves as the senior multi-TADIL interface control officer (ICO) in support of a joint task force (JTF). The JICO's responsibilities include planning and management of the joint multi-TADIL network within a theater of operations. Each JTF has only one JICO assigned to it.

C-4. To support JTF operations, a multi-TADIL AO will be subdivided into regions and sectors. The JICO assigns regional interface control officers (RICOs) and sector interface control officers (SICOs) to govern these areas using the same techniques and procedures as the JICO uses. Only RICO or SICO cell structure (equipment and personnel) may differ. These cells are organized according to mission requirements and platform configuration. Figure C-1, on page C-2, depicts a notional JTF JICO command and coordination structure. The diagram shows the relationships between the JICO and the principal supported commander (JFACC), as well as the JICO's control and coordinating responsibilities with subordinate and adjacent elements (RICO and SICO). The diagram also depicts coordinating relationships between RICOs and component commanders, who may be under tactical control.

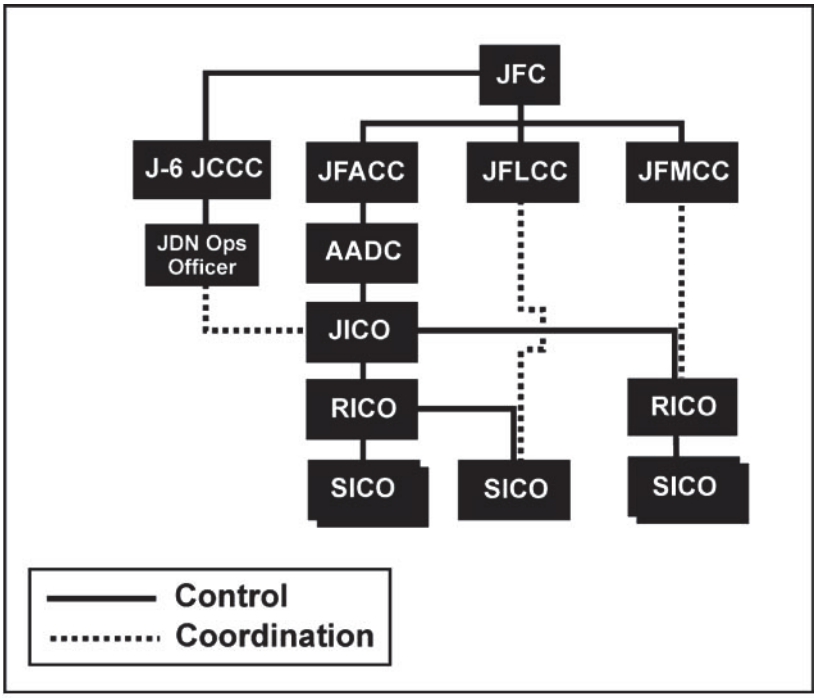

Figure C-1. JTF JICO

JICO RESPONSIBILITIES

C-5. The JICO plans the military training agreement (MTA), supports I-ERs for other supported commanders, and manages the information derived from data exchanged across the MTA. He also drafts the OPTASKLINK, coordinates the initiation of and monitors the multi-TADIL network, and takes network corrective actions. If the JTF requires regional multi-TADIL networks, the JICO has the responsibility of planning the regional architecture with assistance from his RICOs When operations cease; he coordinates the termination of networks.

ADAFCO

C-6. The air defense artillery fire control operations element deploys to the appropriate controlling authority at the region air defense commander (RADC) or sector air defense commander (SADC) higher echelon unit (HEU) and is responsible for integrating Army AMD engagement operations into JIADS to destroy, nullify, or reduce the effectiveness of all hostile air and missile threats against friendly forces and to reduce the potential for fratricide.

C-7. The ADAFCO element is the single Army point of contact between land-based AMD fire direction centers (FDCs) and the appropriate controlling authority (RADC or SADC). Based on the location of the appropriate controlling authority and METT-TC characteristics, ADAFCO elements may be assigned to the USAF CRC, AWACS, the United States Navy (USN) AEGIS combat system, the United States Marine Corps (USMC) tactical air operations center (TAOC), or the combined force air component commander's (CFACC) combined air operations center (CAOC) in order to conduct continuous (24-hour) operations and ensure effective span of control.

C-8. The ADAFCO elements are provided by Army air defense brigades, organized as a modular nine-Soldier engagement operations cell, which includes Air Defense Artillery Fire Control Assistants (ADAFCAs) that assist the ADAFCO and ADAFCO officers that operate as part of an air operations module crew. The ADAFCO officer serves as the missile control officer (MCO) for Army air defense weapon system engagement operations and is under direct control of the controlling authority's senior

weapons director (SWD) or mission crew commander (MCC). Once assigned to one of the above controlling authority locations, the ADAFCO element is responsible for, but not limited to—

- Providing assistance for rapid engagement of airborne targets/platforms.
- Providing friendly protect functions.
- Reducing the potential for fratricide.
- Providing assistance in the surface-to-air fight.
- Coordinating Army AMD for designated assets/areas based on the defended asset list (DAL) and critical asset list (CAL).
- Coordinating and monitoring command, track, and individual AMD fire unit information.
- Controlling Army AMD engagements.
- Deconflicting with airborne platforms and air defense assets via RADC/SADC mission crews.
- Conducting track identification and correlation.
- Disseminating and complying with air defense warnings (ADWs), ACOs, surface-to-air missile tactical orders (STOs), special instructions (SPIN), early warning data, real-time intelligence, and ATOs.
- Establishing and maintaining uninterrupted voice and data connectivity to air defense firing units.
- Receiving engagement reports, surface-to-air missile status reports (SAMSTATREPs), and subordinate land-based air defense unit sensor data.

C-9. Although ADAFCO elements have responsibilities that overlap into force operations, these engagement operation cells do not function as liaison cells. The ADAFCO officer must thoroughly understand the ATO, ACO, ACMs, Friendly Air battle Plan, and enemy air order of battle (AOB) to effectively employ joint fires for AMD. While AAMDC liaison teams focus on force operations, the ADAFCO element deployed from the ADA brigade executes the AMD plans prepared by the AAMDC and ADA brigade(s). The AAMDC has a planning and coordination responsibility to ensure ADAFCO elements are integrated into joint theater air and missile defense operations.

AIR FORCE THEATER AIR CONTROL SYSTEM

C-10. To achieve positive control of its airspace, the ADAM cell must coordinate with, and use, the Air Force theater air control system illustrated in Figure C-2. The Air Force forces (AFFOR) commander works directly for the JFACC and establishes a JAOC. Service components provide liaisons to man cells or teams in the JAOC. Some of these teams include the BCD, Army Air and Missile Defense Command (AAMDC) liaison team, a Marine liaison officer, a naval and amphibious liaison element, special operations liaison element, and a space liaison officer.

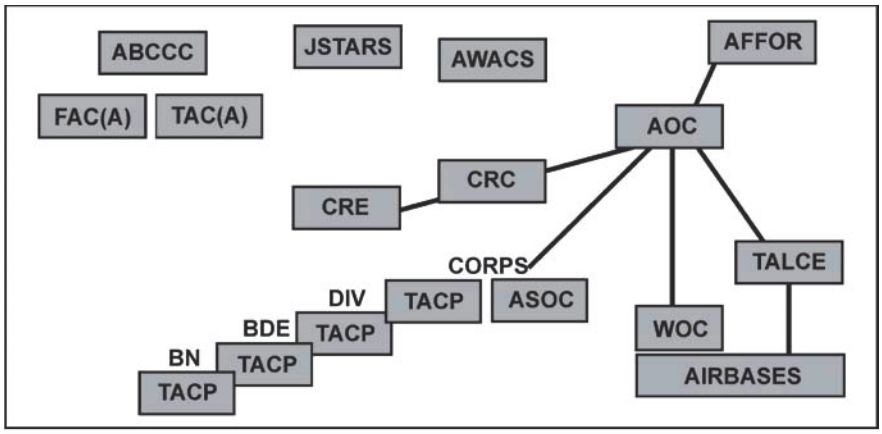

Figure C-2. Air Force theater air control system

CONTROL AND REPORTING CENTER

C-11. The CRC normally rates as the senior radar control facility. In addition, the AMD brigade provides the CRC with an air defense liaison responsible to the CRC for real-time air defense matters. The AD liaison also keeps the BCD located in the CAOC informed of the current situation. The control reporting element, a subordinate radar element of the CRC, extends the radar range of the CRC for EW and aircraft control purposes. It also provides EW, surveillance, weapons control, and ID to the CRC.

AIR TASKING ORDER

C-12. The ATO is a detailed order developed by the JFACC that describes and directs the overall air operation. The ATO provides the details for individual sorties to include targets, mission timing, weapons loads, air refueling data, call signs, and SPIN. The SPIN are free text formats included as part of the ATO. They contain essential information that highlights, modifies, or supplements data contained in other portions of the ATO. These instructions may also contain data that modifies, changes, or replaces information contained in OPORDs. Such information includes airspace changes, IFF, and selective identification feature (SIF) assignments, control agencies, and frequencies. Developing and executing the ATO is a continuous and dynamic process. The reader can find additional information on the ATO in JP 3-30 and FM 3-52.2.

C-13. The JFACC uses the USMTF (A659) ATO to task-assign and attach air resources, to include cross-force and intraservice tasking. Staff personnel prepare the ATO using the joint standard ATO software of the TBMCS. Transmission of the ATO to users depends on the communications systems and the information systems available to transmit and receive the ATO. To lessen the burden that large ATOs place on transmission systems, the ATO is placed on the BDE webpage after the ADAM cell has downloaded it from the higher headquarters' webpage. With this process, only the people requiring the ATO actually download it and avoid sending it to the wrong people and burdening the bandwidth in the BDE. This message is updated daily, 12 hours prior to the start of the air-tasking day or according to the established operation plans for the theater of operations. The air-tasking day will normally consist of consecutive 24hour tasking periods with start and end times as specified by the theater commander.

AIRSPACE CONTROL ORDER

C-14. The ACO is developed from the airspace control plan. It directs the use of joint airspace and details the approved requests for ACMs. The ACO is published on a cyclical basis, depending on the theater. Normally, the ACA publishes and distributes it daily. It may be part of the ATO or a stand-alone document. It may be a perpetual document with published ongoing updates. While the ACP provides general guidance on airspace control, the order institutes airspace control procedures for specified periods.

The ACO contains modifications to the ACP guidance and procedures, and it activates or deactivates procedural control measures. The ACO lists, but is not limited to, ACMs and procedures used on or over the AO. It may include fire support coordination measures and SOPs. Two important considerations when distributing the ACO are timing and dissemination means. The ACO and ATO cycles interrelate. Whatever publication and distribution means are used, it is critical to mission success that airspace users receive pertinent airspace information as early in the planning cycle as possible.

C-15. USMTF (F756) ACO is used to provide specific detailed orders for airspace management and control from a higher command to subordinate units. The primary method to transmit is to have the ADAM cell download the ACO from the higher element's website (for example, CENTCOM) and post it to the BDE webpage. This allows the battalions to download the ACO without coming to the BDE TOC to receive a paper copy. There should be a spot on the main page of the BDE webpage to click for access to the file. The frequency to transmit or update is as required.

AIR FORCE TACTICAL AIR CONTROL PARTY

C-16. An Air Force tactical air control party (AFTACP) plans, coordinates, and directs air support for ground forces. It normally collocates with the fires and effects coordination cell (FECC) at the BCT main CP. The Air Force liaison officer advises the BCT commander and staff on air support matters. He leverages the expertise of the brigade's AFTACP—and seeks assistance from AFTACPs located at division or corps level if needed—in order to plan, coordinate, synchronize, and execute air support operations. The Air Force liaison officer also maintains situational understanding of the total air support and air support effects picture. Battalion-level AFTACPs will include an Air Force liaison officer and an enlisted terminal air controller(s) with the added responsibility of terminal attack control—defined as actually directing an attack aircraft onto an enemy target. Air Force enlisted terminal air controller(s) may be employed forward with a fire support team based on the tactical situation. AFTACPs coordinate activities through an Air Force air request net and the advanced airlift notification net. The AFTACP will provide coordination interface with the FSC and the battalion FSCOORDs. It will work with the ADAM cell to help manage airspace in the BCT's AO. The ADAM cell must coordinate with the AFTACP to cement local air defense and airspace management activities and ensure SU and SA.

AIRSPACE MANAGEMENT LIAISON SECTION

C-17. Located with the CRC, the Airspace Management Liaison Section (AMLS) consists of staff from all service or coalition partners involved in the operation. The AMLS plans, coordinates, and integrates all activities related to airspace control and reports to the ACA. This liaison handles real-time Army airspace management issues that may arise during execution of air operations.

AIR DEFENSE LIAISON SECTION

C-18. Normally located at the theater air operations center or the CRC, the air defense liaison section has the responsibility for planning, coordinating, and integrating air defense activities for the AADC. If additional components, such as multinational forces, participate in an operation, then these elements will provide liaison personnel to the JFACC, ACA, and AADC. These liaisons provide the service expertise necessary to coordinate and execute airspace control and air defense activities. Liaison officers assist in rapidly engaging airborne threats.

Liaison Visit

During OIF 1, the ADAM cell OIC traveled to Qatar to visit the JICO, AWACS, and BCD cells in the CAOC. This visit yielded several benefits—it built rapport with these personnel which helped fix problems later; it helped the ADAM cell to obtain a JRE from the JICO; and the OIC received the settings for MiRC, a real-time military chat network established on the SIPRNET. The CAOC constantly monitored the MiRC, and its use by ADAM cell personnel helped rapidly solve problems and increase situational awareness.

CPT Scott L. Mace

BRIGADE COORDINATION DETACTMENT

C-19. See FM 100-13 for detailed information.

BCD MISSION

C-20. Close coordination between the Army forces commander and the JFACC is required to achieve the Army functional responsibility of synchronizing maneuver, fires, and interdiction in the army forces AO. The BCD mission is to establish the army forces liaison and interface with the JFACC. The BCD eases the coordination and synchronization of JFACC air and army forces ground operations. The BCD mission is performed by accomplishing the following:

- Exchanging operational and intelligence data between the JFACC and army forces commander.
- Interpreting the land battle situation for the JFACC and the air operations situation for the army forces commander.

C-21. The BCD operates on a 24-hour-a-day basis.

BATTLE COMMAND

C-22. Battle command is the art of decision making, leadership, and of motivating Soldiers and their organizations to accomplish the mission. It includes visualizing and formulating concepts of operations to get from the current to the desired situation at the least cost. Battle command also includes the following:

- Assigning missions.
- Prioritizing and allocating resources.
- Selecting the critical time and place to act.
- Knowing how and when to make adjustments during the fight.

C-23. The primary role of the BCD is to support the army forces commander's ability to conduct battle command. The personnel in the BCD must understand what information the commander deems important in making decisions and get it to him in a timely fashion. The BCD supports battle command by providing timely and accurate input to the army forces commander's decision-making process and by assisting the army forces staff during execution. Commanders must understand the battle from the perspective of both the supported and supporting commanders. This thorough understanding of intent promotes unity of effort.

C-24. Communication is the bridge that links information to decisions and decisions to actions. The BCD is in a unique position to support the army forces commander's communication needs by locating in proximity to liaison teams of all the separate component commanders.

FIREPOWER MEANS

C-25. The BCD presents the army forces commander's targeting requirements for preplanned CAS and area of interest (AI) to the JFACC. The BCD also passes JFACC requests for all army forces supporting fires to the army forces TOC or firing unit as directed in the army forces fire support plan. The BCD ensures that the JFACC staff is aware of current and planned army forces fire support operations, including confirmation of associated coordination and control measures. The BCD eases synchronization of the JFACC's AI operation with army forces unassigned area plans. The JFACC and army forces commander discuss requirements for AI support to army forces operations, typically during the joint targeting coordination board (JTCB) meeting. After the discussion, the BCD helps the JFACC staff identify targets when the army forces commander gives "mission-type" objectives for AI.

C-26. The BCD monitors execution of the ATO and passes information about the current air situation to the army forces commander. The BCD passes information through the army forces staff to commanders affected by JFACC attack of targets beyond the fire support coordination line (FSCL). This lets air and ground forces take positive actions to avoid fratricide and duplication of effort. The BCD works closely with the JAOC to synchronize AI missions with Army unassigned area strike assets on the most lucrative targets. The BCD performs supporting tasks assigned by the army forces commander to plan, coordinate, and execute lethal and nonlethal joint firepower. The JFC may direct the integration of planned army forces airspace operations into the ATO. The BCD eases the integration of the systems into the ATO and helps track execution of their missions.

AIRSPACE MANAGEMENT

C-27. The BCD coordinates army forces airspace management needs with the JAOC. These needs reflect requirements for use of airspace throughout the army forces AO by the following:

- Army forces fixed- and rotary- winged aircraft.
- Reconnaissance and surveillance platforms such as UAS.
- Indirect fire trajectories.

C-28. The BCD coordinates army forces requests for ACMs with the ACA. When the JFC designates the JFACC as the ACA, the coordination occurs at the JAOC. When the JFACC is not the ACA, the army forces commander must provide other liaison and communications means to the designated ACA.

C-29. The BCD passes information to the army forces regarding JFACC air operations within the army forces AO. On the basis of information from the special operations liaison element (SOLE), the BCD monitors the location of special operations forces (SOF). The monitoring includes long-range surveillance units (LRSUs) operating in the army forces AO to help reduce fratricide and/or interference with their special operations missions.

C-30. The BCD also coordinates the use of airspace by ground-based fire support systems, especially rockets and missiles, with other airspace users. The army forces commander is responsible for establishing ACM and FSCMs to both facilitate fires and protect other airspace users. The BCD coordinates these measures with the JFACC staff to ensure they are included in the ACO.

AIR DEFENSE

C-31. The area air defense commander (AADC) is normally the component commander with the best air defense capability and the C3I capability for planning and executing integrated air defense operations. The JFACC may be designated the joint force AADC. The BCD eases coordination between army forces air and missile defense operations and the JFACC staff when the JFACC is also the AADC. The BCD helps the JFACC staff integrate JFACC defensive counterair operations with ground air defense systems. This BCD function is key to effective air defense and to precluding fratricide.

THEATER MISSILE DEFENSE

C-32. The term "theater missile defense" applies to the identification, integration, and employment of forces supported by other theater and national capabilities, to detect, identify, locate, track minimize the effects of, and/or destroy enemy theater missiles (TMs). This includes the destruction of TMs on the ground and in flight, their ground-based launchers and supporting infrastructure; TM-capable ships and vessels in port or at sea; and enemy aircraft armed with air-to-surface missiles. TMD operations are accomplished by integrating a mix of mutually supporting passive defense, active defense, MC, and ISR measures.

C-33. TMD is a joint mission, integrated into and in support of the JFC's overall concept of operation and battle objectives. The JFC establishes guidance and objectives for joint TMD (JTMD). The army forces TOC theater missile defense cell, if formed, plans and coordinates TMD operations for the army forces. The TMD cell gives direct early warning to army forces air defense units, as appropriate. The army forces commander specifies the role of the BCD to help in coordination of TMD active defense and attack operations with the JAOC.

C-34. The BCD may be the first army forces agency aware of the presence of a TMD target through sources at the JAOC. In this case, the BCD helps coordinate the rapid attack of TMD targets by the most efficient means available. With regard to TMD, the BCD does the following:

- Speeds target confirmation.
- Deconflicts airspace.
- Provides early warning to friendly ADA headquarters.
- Directs Army tactical missile system (ATACMS) and multiple launch rocket system (MLRS) missions against TMD targets (when authorized).

AIR DEFENSE SECTION

C-35. The BCD air defense (AD) section supports both the BCD plans and operations sections. The AD section coordinates army forces AD matters with the JAOC combat plans and operations divisions and the army forces ADA headquarters. Digital information systems support the exchange and coordination of air defense and airspace management information. The AD section performs the following functions:

- Coordinates with the army forces air defense element (ADE) and ADA brigade headquarters for the following:
  - Locations of ADA assets.
  - Engagement reporting.
  - ADA weapon engagement zones.
  - Identification, friend or foe (IFF)/selective identification feature (SIF) procedures.
  - Receipt of ADA annexes to OPLANs/OPORDs.
- Advises the AADC on Army air defense matters appropriate to deconfliction of air support to ground operations.
- Coordinates with the CRC the following:
  - ADA unit status.
  - Changes in ADW.
  - Weapons control status (WCS).
  - ROE.
  - Identification procedures.
  - Early warning and TBM alert procedures.
- Advises the senior air defense officer (SADO) in the JAOC of Army air defense status to include placement of ADA weapons in direct support of ground forces.
- Provides Army ADA commander with the AADC's intent.
- Coordinates with the army forces TMD cell for TBM alert dissemination procedures.

- Exchanges ADA operational data with JAOC counterparts.
- Coordinates ADA airspace needs with the JAOC airspace management and BCD airspace management sections.
- Supports integration of the army forces commander's AD plan with the JFACC counterair effort.

AIRSPACE MANAGEMENT SECTION

C-36. The JFC establishes procedures for integration of the joint use of airspace. The airspace management section collocates with the airspace management section of the combat operations division of the JAOC. It coordinates and assists in the use of airspace defined by the joint operation plan or order. The BCD airspace management section supports both the BCD plans and operations sections. All army forces elements using joint airspace must be integrated into the ACP developed by the ACA as directed by the JFC. Digital information systems support the exchange and coordination of airspace management information. The section maintains identification of all army forces airspace users. Army forces airspace users include the following:

- Fire support.
- ADA operations.
- Army aviation operations.
- Special electronic mission aircraft (SEMA) operations including UAS, medical evacuation aircraft, and multinational and joint operations.

C-37. Airspace management requires coordination with both plans and operations personnel within the JAOC. The BCD airspace management section performs the following functions:

- Coordinates army forces airspace use requirements with the JAOC airspace management sections.
- Coordinates SOF airspace requirements when directed.
- Integrates joint airspace requirements with appropriate AMC elements.
- Integrates army forces airspace user activities with the JAOC airspace plans. Represents army forces commander's interests in the development and approval of airspace control measures and restrictions published in the ACO.
- Advises the ACA and BCD commander of significant activities which affect the joint use of airspace.
- Advises the ACA and BCD commander on the impact of joint airspace control measures or restrictions on the conduct of the ground battle.
- Coordinates army forces commander's requests for airspace control measures and restrictions to include EW requirements.
- Ensures Army aviation missions are included in the joint ATO for the purpose of coordination, when necessary. In stability operations, all rotary- and fixed-winged aircraft are normally included in the ATO. In combat operations, SEMA and operational support airlift (OSA) will normally be included.
- Ensures all AMC elements have the necessary IFF/SIF codes.
- Provides timely and complete distribution of the ACP to the army forces TOC AMC element.
- Monitors the integration of Army ATS facilities into the airspace control system of the JAOC.
- Represents the army forces in developing the ACO.
- Provides the ACA with the location and status of Army airfields, navigation aids (NAVAIDs), standard Army aviation flight route (SAAFRs), and ATS facilities.
- Coordinates with the following sections on airspace matters:
  - The BCD plans section for future Army aviation, military intelligence (MI), plans, and other airspace matters.
  - The BCD operations section on current airspace use.

- The JAOC combat plans division for requests for future airspace control measures, scheduling of army forces aircraft into the ATO, and Army IFF/SIF codes.
- The JAOC combat operations division for changes to the ATO/ACO; army forces IFF/SIF codes; immediate requests for special use of airspace (including immediate establishment of restricted operating zones to support ATACMS fire missions); and the location and status of Army airfields, ATS facilities, NAVAIDS, and SAAFRs.
- Army forces TOC AMC cell on Army aviation plans, IFF/SIF code requirements and assignments, airspace control measure requests, SAAFR NAVAID, airfield, and ATS facility status, and the ATO/ACO.
- Army aerial exploitation battalion TOCs on their use of airspace.

Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

ADAM	air defense airspace management (cell)
ADE	air defense element
ADO	Air Defense Officer
ADSI	air defense system integrator
ADW	air defense warning
AFATDS	Advanced Field Artillery Tactical Data System
AFFOR	Air Force forces
AFTACP	Air Force tactical air control party
AI	area of interest
ALO	air liaison officer
ALOC	Administrative and Logistical Operations Center
AM	amplitude modulation
AMD	air and missile defense
AMDOO	Air and Missile Defense Operations Officer
AMDWS	air and missile defense workstation
AMLS	Airspace Management Liaison Section
AO	area of operation
AOB	**Airfield Operations Battalions**
AOC	**air operations center**
ANDVT	advanced narrowband digital voice terminal
ARM	antiradiation missile
APC	armored personnel carriers
ASIP	advanced system improvement program
ATACMS	Army tactical missile system
ATG	antenna-transceiver group
ATDL	Army tactical data link
ATCCS	army tactical command and control system
ATO	Air Tasking Order
ATS	air traffic service
AVN	Aviation
AWACS	airborne warning and control system
BAE	Brigade Aviation Element
BAS	Battlefield Automated System

BAO	Brigade Aviation Officer
BC	battle command
BCD	Brigade Coordination Detachment
BCS3	Battle Command Sustainment Support System
BCT	Brigade Combat Team
BfSB	Battlefield Surveillance Brigade
BITE	built-in test equipment
BM	ballistic missile
BLOS	beyond line of sight
BRL	baseline resource list
BSB	brigade support battalion
Btry	battery
MC	command and control
MC**I**	command, control, and intelligence
C3I	command, control, and communications intelligence
CAL	critical asset list
CAOC	combined air operations center
CAS	close air support
CAU	crew access unit
CB	circuit breaker
CBRN	chemical, biological, radiological, and nuclear
CBRNE	chemical, biological, radiological, nuclear, and high-yield explosives
CCIR	commander's critical information requirements
CCP	casualty collection point
CDM	chemical downwind message
CDR	chemical downwind report
CENTCOM	US Central Command
CFACC	combined force air component commander
CFPD	color flat panel display
CGS	common ground station
CHEMO	chemical officer
CHOPs	Chief of Operations
CIC	combat information center
CID	combat identification
CM	cruise missile
CMP	configuration management plan; common message processor
COA	course of action
COC	combat operations center
COE	Common Operating Environment
comms	communications
COMSEC	communications security

CONOPS	continuous operations
COP	common operational picture
CP	command post
CPP	command post platform
C-RAM	Counter-Rocket, Artillery, and Mortar
CRC	control and reporting center
CRD	capstone requirement document
CRP	control reporting point
CSB	Combat Support Brigade
CTAPS	contingency Theater Air Control System automated planning system
CTP	common tactical picture
CTSF	Central Technical Support Facility
DAGR	Defense advanced global positioning system receiver
dB	Decibel
DC	direct current
DCA	defensive counterair
DCE	Distributed Computer Environment
DHCP	dynamic host configuration protocol
DII COE	defense information infrastructure common operating environment kernel
DISC4	Director of Information Systems for Command, Control, Communications and Computers
DNS	domain name server
DoD	department of defense
DTG	date-time-group
DTTS	digital tactical trunking switch
EAAD	enhanced area air defense
EAB	exclusion area boundary
EBC	embedded Battle Command
ECM	electronic countermeasures
ECCM	electronic counter-countermeasures
ECU	environmental control unit
ENGR	Engineer
EO	engagement operations
EOD	explosive ordnance disposal
EPLRS	enhanced position location reporting system
EW	early warning
EWS	early warning system
FAA	Federal Aviation Administration
FAAD	forward area air defense
FARP	forward arming and refueling point
FBCB2	Force XXI battle command—brigade and below FCC fire control center

FDC	fire direction center
FDL	FAAD data link
FECC	fires and effects coordination cell
FFIR	friendly force information requirements
FLIR	forward-looking infrared
FLOT	forward line of own troops
FM	frequency modulation; field manual
FMI	field manual interim
FRAGO	fragmentary order
FSCL	fire support coordination line
FSC	fires support cell
FSCM	fire support coordination measure
FSCOORD	fire support coordinator
FTP	file transfer protocol
FU	fire unit
FW	fixed wing
G-1	Assistant Chief of Staff, Personnel
G-2	Assistant Chief of Staff, Intelligence
G-3	Assistant Chief of Staff, Operations and Plans
G-4	Assistant Chief of Staff, Logistics
G-6	Assistant Chief of Staff, communications system Operations
G-9	Assistant Chief of Staff, Civil Affairs
GALE	Generic Area Limitation Environment
GBDL	ground-based data link
GBS	global broadcast system
GCCS	Global Command and Control System
GCCS-A	Global Command and Control System-Army
GENTEXT	general text
GPS	global positioning system
GUI	graphic user interface
HEU	higher echelon unit
HIDACZ	high density airspace control zone
HMMWV	high-mobility, multipurpose wheeled vehicle
HMT	high-mobility trailer
HVA	high value asset
Hz	hertz
I-ER	Informix Enterprise Replicator
IADS	integrated air defense system
IBS	Integrated Broadcast System
ICO	Interface Control Officer

IFF	identification, friend or foe
ID	identification
IM	information management
IP	internet protocol
IPB	Intelligence preparation of the battlefield
IR	information requirements
ISR	intelligence, surveillance and reconnaissance
IXP	Information Exchange Plan
JAOC	joint air operations center
JCDB	joint common database
JDN	joint date network
JFACC	joint force are component command
JFC	joint force commander
JFLCC	joint force land component command
JIADS	joint integrated air defense system
JICO	joint interface control officer
JICU	joint interface control unit
JLENS	Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System
JMTK	joint mapping tool kit
JMTOP	joint multi-TADIL operating procedures
JP	Joint Publication
JPEG	Joint Photographic Experts Group
JSTARS	Joint Surveillance and Target Attack Radar System
JRE	joint range extension
JTAGS	joint tactical ground station
JTAMD	joint theater air and missile defense
JTCB	joint targeting coordination board
JTF	joint task force
JTIDS	Joint Tactical Information Distribution System
JTMD	joint theater missile defense
JTOC	joint tactical operations center
JTT	joint tactical terminal
JVMF	joint variable message format
JWORN	joint warning and reporting network
K-BAS	knowledge-based analysis and situation assessment
KE	kinetic energy
kg	kilogram
kHz	kilohertz
kw	kilowatt
kybd	keyboard
KVM	keyboard-video-mouse

LAAD	low-altitude air defnese
LAN	local area network
LAV-AD	light-armored vehicle (air defense)
LNO	liaison officer
LOC	line of communications
LOS	line of sight
LRF	laser range finder
LRSD	long-range surveillance detachment
LRSU	long-range surveillance unit
LRU	line replaceable unit
LSD	large screen display
LTC	lieutenant colonel
LTIOV	latest time information of value
M	meter
MACS	Marine Air Control Squadron
MAINT	maintenance
MAN	maneuver
MANPADS	man-portable air defense system
MCC	mission crew commander
MCO	missile control officer
MCOO	modified combined obstacle overlay
MARFOR	Marine Corps forces
MCPS	Mobile Command Post System
MCS	maneuver control system
MCSU	micro central switching unit
MDMP	military decision-making process
ME	Maneuver Enhanced
MEADS	Medium Extended Air Defense System
Mech	mechanized
MED	medical
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, civil considerations
MFC	multinational force compatibility
MHT	message handling table
MHz	megahertz
MI	Military Intelligence
MICLIC	mine clearing mine charge
MIDS	Multifunction Information Distribution System
MILSTAR	military strategic and tactical relay system
MILU	multinational integrated logistic support unit
MLRS	multiple launch rocket system

MOPP mission-oriented protective posture
MP military police
MRBM medium-range ballistic missile
MS Microsoft
MSE mobile subscriber equipment
MSO mission-staging operations
MSR major supply route
MST maintenance support team
MTA military training agreement
MTF medical transfer facility
MTN multi-TADIL net
MTOE modified table of organization and equipment
MTW major theater war
MUL master unit list
NAVAID navigation aids
NATO North Atlantic Treaty Organization
NCO noncommissioned officer
NCOIC Noncommissioned officer in charge
NCS net control station
NRT near real time
O/R originator/recipient
OIC office in charge
OCA offensive counterair
OPCON operational control
OPLAN operation plan
OPORD operation order
OPTASKLINK operational tasking link
OS operating system
OSA operational support airlift
PIR priority intelligence requirements
PPS precise positioning service
PVNT position, velocity, navigation and timing
QEAM quick-erect antenna mast
RADC region air defense commander
RAM Rocket, Artillery, and Mortar
RCT remote control terminal
RF radio frequency
RFA request for action
RFI request for information
RI relevant information
RICO regional interface control officer

ROE rules of engagement
ROZ restricted operations zone
RSO&I reception, staging, onward movement, and integraion
RSTA reconnaissance, surveillance, and target acquisition
RTU remote terminal unit
RW rotary wing
RWS rigid wall shelter
S-1 personnel staff officer
S-2 intelligence staff officer
S-3 operations staff officer
S-6 communications system operations officer **S-9** civil-military operations officer
S&S supply and support
S/R Situational Awareness/Replication
SA situational awareness
SAAFR standard Army aviation flight route
SAASM Selective Availability Anti-Spoof Module
SAAWF sector antiair warfare facility
SADC sector air defense commander
SADO senior air defense officer
SALUTE size, activity, location,unit, time, and equipment
SAMSTATREP surface-to-air missile status report
SARK Savile advanced remote keying
SAT satellite
SAT-J J band satellite
SATCOM satellite communications
SBCT Stryker Brigade Combat Team
SCDL surveillance control data link
SCTACSAT single-channel tactical satellite
SEMA special electronic mission aircraft
SEP signal entrance panel
SIAP single integrated air picture
SICO sector interface control officer
SICPS standardized integrated command post system
SIDPERS Standard Installation/Division Personnel System
SIF selective identification feature
SINCGARS single-channel ground and airborne radio system
SIPR SECRET Internet Protocol Router
SIPRNET SECRET Internet Protocol Router Network
SLAMRAAM surface-launched advanced medium range air to air missile
SOF special operation forces
SOLE special operations liaison element

SOP	standard operating procedure
SoS	system-of-systems
SPIN	special instructions
SR	send and receive
SRBM	short-range ballistic missile
SSC	small-scale contingency
STO	surface-to-air missile tactical orders
STE	secure terminal equipment
STU	secure telephone unit
SU	situation understanding
SVML	standard vehicle-mounted launcher
SW	Secure wireless
SWD	senior weapons director
TAC	tactical
TACLAN	tactical LAN
TACSOP	tactical standard operating prodecure
TAIS	Tactical Airspace Integration System
TAOC	tactical air operations center
TBM	tactical ballistic missile
TBMCS	theater battle management core system
TCD	tactical communications diagram
TCIM	tactical communications interface modem
TDDS	Tactical Data Distribution System
TDMA	division multiple access
TF	task force
THAAD	Terminal High-Altitude Area Air Defense
TI	tactical internet
TIBS	tactical information broadcast service
TIP	tent interface panel
TM	theater missiles
TMD	theater missile defense
TOE	table of organization and equipment
TPIO-ABCS	TRADOC Programs Integration Office - Army Battle Command System
TQG	tactical quiet generator
TRN	Time Rule Name
TSEC	transmission security
TSP	training support package
TTP	tactics, techniques, and procedure
TUAS	unmanned aircraft systems
UHF	ultrahigh frequency
UIC	unit identification code

UPS	uninterruptible power supply URN unit reference number
URO	unit readout USAADASCH United States Army Air Defense Artillery School
USAF	United States Air force
USMTF	United States message text format
VGA	video graphics array
VHF	very high frequency
VMF	variable message format
VRC	vehicle radio communication
VTC	Video tele-conference
WAN	wide area network
WARNO	warning order
WAVES	wireless audio visual emergency system
WCS	weapon control status
WDS	wireless distribution system
WebTAS	Web Enabled Temporal Analysis System
WFF	warfighting functions
WMD	weapons of mass destruction
WO	warrant officer
WOTS	worldwide origin and threat system
WS	workstation
XO	executive officer

SECTION II – TERMS AND DEFINITIONS

Area of operations

An operational area defined by the joint force commander for land and naval forces. Area of operations do not typically encompass the entire operational area of the joint force commander, but should be large enough for component commanders to accomplish their missions and protect their forces. For Army forces, it is a geographical area, including the airspace above, usually defined by lateral, forward, and rear boundaries assigned to a commander, by a higher commander, in which he has responsibility and the authority to conduct military operations.

Command and control

The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of a mission. Commanders exercise command and control through a command and control system.

Command and control system

The arrangement of personnel, information management, procedures, and equipment and facilities essential for the commander to conduct operations.

Command post

A unit's headquarters where the commander and staff perform their activities.

Common operational picture

An operational picture tailored to the user's requirements based on common data and information shared by more than one command.

Decibel (dB)

A logarithmic unit of measurement in acoustics and electronics.

Defense design

A sub-process of defense planning in which a specific laydown of friendly elements, along with initializing and controlling parameters, is developed to achieve the commander's desired outcome.

Defense planning

The holistic process by which the commander envisions a desired outcome, lays out effective ways of achieving it, and communicates to his subordinates his vision, intent, and decisions, focusing on the results he expects to achieve.

Engagement operations (EO)

EO includes those functions required to execute the air, missile, and counter-surveillance battles. The air surveillance function establishes a correlated air picture with target types and identification. The mission control function processes commands from higher echelon units, evaluates the threat, optimizes engagement performance, monitors the outcome of engagements, and manages the employment of sensors and decoys. The attack operations support function determines the location of enemy air and missile launch sites and provides it to attack systems. The data distribution function distributes the air picture and track data.

hertz (symbol: **Hz**)

A unit of frequency. It is defined as the number of complete cycles per second. It is the basic unit of frequency in the International System of Units (SI), and is used worldwide in both general-purpose and scientific contexts. Hertz can be used to measure any periodic event; the most common uses for hertz are to describe radio and audio frequencies, more or less sinusoidal contexts in which case a frequency of 1 Hz is equal to one cycle per second.

Kilowatt

The kilowatt, equal to one thousand watts, is typically used to state the power output of engines and the power consumption of tools and machines. A kilowatt is approximately equivalent to 1.34 horsepower.

Line of sight

The unobstructed path from a soldier, weapon, weapon sight, electronic-sending and -receiving antennas, or piece of reconnaissance equipment to another point. Also called **LOS**.

Operational environment

A composite of the conditions, circumstances, and influences that affect the employment of military forces and bear on the decisions of the unit commander.

Organic

Assigned to and forming an essential part of a military organization. For AMD, the application includes attachment to a military organization as a result of task force tailoring using METT-TC.

Planning

The process by which commanders (and staff if available) translate the commander's visualization into a specific course of action for preparation and execution, focusing on the **expected results**.

Situational awareness

The ability to have accurate and timely information of friendly, enemy, neutral, and noncombatant locations and activities. This information is essential for developing the common operational picture and provides the basis for situational understanding.

Situational understanding

The product of applying analysis and judgment to the common operational picture to draw METT-TC conclusions.

Task force

A temporary grouping of units, under one commander, formed for the purpose of carrying out a specific operation or mission. In the context of this concept of operations document, a task force

Wide area network (WAN)

A computer network that covers a broad area (i.e., any network whose communications links cross metropolitan, regional, or national boundaries).

Workstation

A high-end microcomputer designed for technical or scientific applications. Intended primarily to be used by one person at a time, they are commonly connected to a local area network and run multi-user operating systems.

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ATP 3-01.50
5 April 2013

By Order of the Secretary of the Army:

RAYMOND T. ODIERNO
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
1309503

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