FM 3-01 (FM 44-100)

U.S. Army Air and Missile Defense Operations

NOVEMBER 2009

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Headquarters, Department of the Army

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Field Manual	Headquarters
No. 3-01	Department of the Army
	Washington, DC, 25 November 2009

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*This publication supersedes FM 44-100, U.S. Army Air Defense Operations, 15 June 2000.

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Preface

FM 3-01 is the Army Air Defense Artillery's (ADA) capstone doctrinal publication. The seven chapters that make up this edition of *Air and Missile Defense Operations* constitute the Army ADA's view of how it conducts prompt and sustained operations and sets the foundation for developing the other fundamentals and tactics, techniques, and procedures detailed in subordinate field manuals. FM 3-01 also provides operational guidance for commanders and trainers at all echelons.

- Chapter 1 provides a general overview of Army Air and Missile Defense (AMD) operations and the Air Defense Artillery (ADA) mission. The strategic, operational, and tactical levels of war are discussed and AMD operations are defined in terms of their contribution to the Army Operational Concept of Full Spectrum Operations and the Joint Counterair mission.

- Chapter 2 describes the basic concepts inherent in air and missile defense operations which have been developed and improved through many years of operations, both combat and real world deployments. This includes employment principles and guidelines, and engagement operations principles.

- Chapter 3 addresses Command and Control in AMD operations and conforms to Joint Air and Missile Defense doctrine as updated with the lessons learned in Operation Iraqi Freedom (OIF).

- Chapter 4 describes Army Air Defense participation in offensive and defensive operations. Offensive operations aim is to defeat the enemy decisively by using overwhelming, aggressive force. Defensive operations defeat an enemy attack, buy back time, economize forces, and/or develop conditions favorable for offensive operations. Air defense elements protect friendly forces and geopolitical assets and accomplish other missions assigned by the JFC. At the Strategic level of war ADA forces protect high visibility JIIM and national assets, as a layer within the ballistic missile defense system (BMDS) and supports homeland defense operations. At the Operational level of war, ADA forces protect the theater assets based on the JFCs critical asset list (CAL) like, seaports of embarkation, air ports of embarkation, cities, logistic centers, religious centers, and lines of communications (LOC). At the tactical level of war, Army ADA forces support the Land Component Commanders (LCC)/ARFOR scheme of maneuver while protecting Theater, Corps, Division, and Brigade Combat Teams (BCTs) forces according to the JFC's defended asset list (DAL) priorities.

- Chapter 5 describes the participation of ADA forces in stability operations and civil support operations. Stability operations are conducted outside the U.S. and its territories to promote and protect U.S. national interests. Civil support operations are conducted to address the consequences of natural or manmade disasters, accidents, and incidents within the U.S. and its territories. This chapter describes ADA participation in support of Homeland Security, Homeland Air Security, and counter-drug operations. ADA units may be tasked to provide soldiers and ADA equipment for civil support operations.

- Chapter 6 describes the Army ADA contribution to and benefit from achieving information superiority. Information superiority is the operational advantage derived from the ability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same. Information superiority is the product of intelligence, surveillance, and reconnaissance (ISR), information management (IM), and information operations (IO). Information superiority enables ADA forces to see first, understand the situation more quickly and accurately, and act faster than their adversaries.

- Chapter 7 discusses the sustainment of Air Defense Artillery (ADA) organizations and the unique challenges to the commanders and staffs of these organizations.

Four appendixes complement the body of the manual. Intelligence Preparation of the Battlefield is in Appendix A. Air and missile threats facing Army ADA forces and systems are in Appendix B. Air and missile defense planning is in Appendix C. A discussion of the impact of technology on ADA forces is in Appendix D.

Introduction

This field manual is the Army Air Defense Artillery (ADA) keystone doctrinal manual for the air defense operations within the protection warfighting function. This manual bridges the gap between Army doctrine and joint and multinational Air and Missile Defense (AMD) doctrine. This manual provides the basis for doctrine, organizations, training, materiel, leader development, personnel and facilities (DOTMLPF) development to meet Army Transformation initiatives for a more agile and responsive force. This manual supersedes FM 44-100, dated 15 June 2000. FM 3-01 details the Army ADA contributions to joint and multinational counterair and theater air and missile defense (TAMD) operations. It also addresses the range of offensive and defensive actions to counter the air and missile threat. This manual provides the doctrinal basis for integrating the air defense function into planning and during strategic, operational, and tactical levels of operations.

FM 3-01 provides doctrinal guidance for commanders and their staff, trainers, and leaders at all levels and is the basis for Army ADA service school curricula development. The primary target audience for this keystone manual includes field grade and above officers. In addition, the other Services and joint organizations can use this manual to gain insight to Army AMD operations. This manual also provides the doctrinal basis for the implementation of air and missile defense operational measures in all Army units. The tactics, techniques, and procedures in the 3-0 series of field manuals complement FM 3-01.

This manual describes Army ADA in the near term or current force operations. This manual also discusses the emerging changes to Army ADA which include the transformation from weapon system capabilities to a Joint team at the strategic, operational, and tactical levels. The driving forces for these changes are: TRADOC Pamphlet 525-3-01.94, the Operational and Organizational (O&O) Concept, and FM 3-0. These concept changes are envisioned to occur after the publication of this manual.

This publication implements an international agreement — Standardization Agreement (STANAG) 3805, Doctrine and Procedures for Airspace Control in Times of Crisis and War (ATP-40 B). The proponent of this manual is United States Army Training and Doctrine Command (TRADOC). This publication applies to the Active Army, the Army National Guard (ARNG)/Army National Guard of the United States (ARNGUS), and the United States Army Reserve (USAR) unless otherwise stated. Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commandant, Air Defense Artillery School, ATTN: ATSA-C, Fort Sill, Oklahoma 73503.

Chapter 1

AIR AND MISSILE DEFENSE OVERVIEW

This chapter provides a general overview of Army Air and Missile Defense (AMD) operations and the Air Defense Artillery (ADA) mission. The strategic, operational, and tactical levels of war are discussed and AMD operations are defined in terms of their contribution to the Army Operational Concept of Full Spectrum Operations and the Joint Counterair mission.

ARMY AIR DEFENSE ARTILLERY MISSION

1-1.   The mission of U.S. Army ADA organizations and elements is to protect the force and selected geopolitical assets from aerial attack, missile attack, and surveillance. ADA forces accomplish this mission by: providing AMD, contributing to situational awareness/situational understanding (SA/SU), contributing to Army airspace command and control (AC2), and contributing to operational protection.

1-2.   Army ADA forces, fighting interdependently with other elements of the joint, interagency, intergovernmental, multinational (JIIM) team at strategic, operational, and tactical levels, will provide AMD and contribute to SA/SU, airspace management, early warning (EW), and operational force protection in order to deter or defeat enemy aerial threats, protect the force and high value assets, enable freedom to operate, and contribute to victory. This mission is normally executed within a joint theater and requires integration and close coordination between Army ADA forces and other counterair forces.

1-3.   The four elements of the ADA vision statement; Dominate-Enable-Exploit-Protect have specific meanings within the context of Army ADA. These elements are imperative to focus on ADA Branch transformation for the future. The Dominate-Enable-Exploit-Protect cycle contributes synergistically to the other elements. Army ADA Branch transformation will address capability gaps as part of a larger Joint Counterair transformation effort.

ARMY ADA IN THE MULTI-DIMENSIONAL BATTLE

1-4.   FM 3-0, Operations identifies six warfighting functions: movement and maneuver, intelligence, fires, sustainment, command and control, and protection. Each of the six warfighting functions has multiple subordinate Army Tactical tasks. The warfighting functions exist at all echelons of command. Successful operations occur when the warfighting functions interact horizontally and vertically. Horizontal interaction occurs when all warfighting functions interact at the same echelon to maximize combat power. Vertical integration occurs when higher and lower echelons within each warfighting function interact to synchronize operations. ADA commanders synchronize their operations by integrating them horizontally with other warfighting functions and vertically within the protection warfighting function.

1-5.   The protection function is the related tasks and systems that preserve the force so commanders can apply maximum combat power. Preserving the force includes protecting personnel (combatant and noncombatant), physical assets, and information of the United States and multinational partners. It includes the following task areas:
- Air and missile defense.
- Personnel recovery.
- Information protection.
- Fratricide avoidance.
- Operational area security.
- Antiterrorism.

- Survivability.
- Force health protection.
- Chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) operations.
- Safety.
- Operations security (OPSEC).
- Explosive ordnance disposal.

UNIFIED ACTION

1-6.   In unified action the combatant commander (CCDR) synchronizes the actions of subordinate units under combatant command authority to achieve unity of effort and accomplish the CCDR's objectives. Army forces, utilizing the capabilities of joint, interagency, and multinational, and commands, seek to expand, strengthen and compensate for limitations, and provide operational and tactical depth to the battlefield.

1-7.   Unified action includes a wide scope of actions including the synchronization of activities with governmental and nongovernmental agencies taking place within unified commands, subordinate unified commands, or joint task forces under the overall direction of the commanders. Under unified action, commanders integrate joint, single-service, special, and supporting operations with interagency, nongovernmental, and multinational-to include United Nations (UN) operations.

LEVELS OF WAR

1-8.   The three levels of war are strategic, operational, and tactical. Understanding the relationship of all three helps commanders visualize a logical flow of operations, allocate resources, and assign tasks. AMD actions within the three levels are not associated with a particular command level, unit size, or force. Actions are based on their effect or contribution to achieving strategic, operational, or tactical objectives.

Strategic Level of War

1-9.   The strategic level of war is that level at which a nation, often as one of a group of nations, determines national/multinational security objectives and guidance; develops and uses national resources to achieve these objectives. Army ADA forces protect geopolitical assets and accomplish other missions assigned. These national strategic objectives facilitate theater-strategic planning. Military strategy is the basis for all operations.

1-10. The strategic level of war involves the use of military and other national capabilities to achieve national or global strategic security objectives. To counter our use of surprise, adversaries will use commercial space-based surveillance and the worldwide media to assist in gathering intelligence on U.S. actions and intent. Adversaries will attempt to deter U.S. involvement or limit its scope and intensity; they will attack using terrorist tactics, Special Operations Forces (SOF) teams, ballistic missiles (BMs), cruise missiles (CMs), and missiles with weapons of mass destruction/effects (WMD/E) warheads.

1-11. Today's Army ADA forces provide support of homeland defense and are used to protect populations and infrastructure from aerial attack. Key infrastructure may include nuclear power plants, power distribution facilities, governmental centers, dams, bridges, and transportation facilities. Attacks may also occur against power projection platforms, embarkation points and national symbols of strength.

1-12. AMD is inherently a joint operation. Defense against air and missile attacks that originate outside the combatant commander's operational environment may also be global operations. Defense of theater and global forces and geopolitical assets may be a critical vulnerability that could affect national resolve; Army ADA units are critical during stability and support operations and during major combat operations.

Operational Level of War

1-13. At the operational level of war, theater commanders participate in national, alliance, and coalition strategy development. They design the theater campaign plan so that it relates to both national strategies and operational activities. The theater campaign plan sets the desired end state and is the basis for

operational-level planning. Combatant and subordinate commanders plan and execute campaigns. Commanders employ military forces and arrange their efforts in time, space, and purpose.

Tactical Level of War

1-14. The tactical level of war encompasses the ordered arrangement of maneuver units in relation to each other, the terrain, civil-considerations and the enemy. Tactics is the realm of close combat, where friendly aircraft and air and missile defense systems are in immediate contact. ADA tactical operations defeat or destroy air and missile threats while supporting the maneuver force. The employment of air and missile defense at the tactical level is the primary concern of Army ADA commanders.

AIR AND MISSILE DEFENSE OBJECTIVES

1-15. Air and Missile defense objectives are similar at all levels of war. Army ADA commanders plan their operations to support the accomplishment of the supported commander's strategic, operational or tactical objectives by protecting critical assets and forces from air and missile attack and surveillance.

STRATEGIC OBJECTIVES

1-16. ADA forces protect forces or geopolitical and military assets of strategic significance at the theater-strategic level. Such assets or forces are critical to the successful achievement of national objectives. Normally, the requirements to protect strategic assets are established by the President and Secretary of Defense. Strategic missions can be assigned to ADA units at every echelon of command. Protection of strategic assets could include cities, economic facilities, and religious or cultural sites that must be protected in the host nation or other regional power. The protection of such assets may be a precondition for the introduction of U.S. forces into the region, for basing privileges, or for the formation and maintenance of a friendly coalition.

> *Note*: Geopolitical assets are nonmilitary assets that U.S., allied, or host nation civil authorities nominate for air and missile defense protection on the Combatant Commander's (CCDR) critical asset list (CAL). These assets could be political, religious, ethnic, historical, cultural, or territorial in nature. Since protection of geopolitical assets may not directly support military operations, integration of geopolitical assets into the ADA defended asset list (DAL) is accomplished at the highest level. Geopolitical assets may include U.S. territories. Geopolitical assets are designated as strategic-, operational-, or tactical-level assets.

OPERATIONAL OBJECTIVES

1-17. The Joint Force Commander (JFC) employs counterair and theater air and missile defense (TAMD) forces to achieve two primary operational objectives: first, control of the environment and second, protection of the force and selected assets.

1-18. Control of the environment may change with time and range from limited local air superiority in a specific part of the operational environment, to air supremacy over the entire area of operations (AO) or theater.

1-19. Army ADA units protect priority forces and assets in the theater according to the JFCs and Joint Forces Land Component Commanders (JFLCC) priorities. In addition, ADA units conduct defensive operations using active and passive measures for defense of assets.

TACTICAL OBJECTIVES

1-20. Tactical operational objectives are to protect forces as commanders' plan and execute battles and engagements, protect forces and assets from attack and surveillance, provide freedom from air threats so forces can maneuver, and to destroy enemy aircraft and missiles in flight. The emphasis at the tactical level is protecting the force.

Ensure the Freedom of Maneuver

1-21. Freedom to maneuver at the tactical level of war is crucial to achieving superior combat power. ADA forces provide the Army the freedom to maneuver and facilitate the ability of land and air forces to shape the operational environment and achieve tactical advantage. Friendly forces must anticipate enemy efforts to deny or disrupt operations.

1-22. At Corps and below, the focus shifts increasingly toward providing freedom to maneuver by protecting the force. These perspectives relate directly to the different battlefield characteristics and requirements at each command level.

Achieve Information Superiority

1-23. Information operations (IO) involve actions taken to affect adversary information and information technology systems while defending one's own information and information systems.

1-24. U.S. and friendly forces must rapidly collect, process, and disseminate information to permit combat units to operate in depth and maintain initiative, agility, and synchronization. The force's dependence on the prompt flow of information makes battle command centers prime targets for enemy air and missile defense operations. Protection of battle command centers is a key objective of air and missile defense operations.

1-25. Denial of enemy Intelligence, Surveillance, and Reconnaissance (ISR) data is extremely important. ADA forces destroy the links between enemy commanders and airborne sensors by engaging air threats possessing sensors and capabilities providing ISR to the enemy. The enemy must then operate blindly and lose offensive potential while U.S. forces infiltrate the enemy's decision cycle.

Right Force at the Right Place and Time

1-26. ADA commanders tailor forces to match the factors of mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC). ADA systems are deployed throughout the depth of the AO. Commanders must ensure that ADA systems are positioned where they are needed to provide critical asset protection.

Sustain the Battle

1-27. ADA systems engaged in combat operations must protect vital assets and forces that perform force sustainment functions. This includes lines of communication; fixed and mobile support facilities; and in decisive, shaping, and sustaining operations. Additionally, ADA forces protect combat/field trains and forward arming and refueling points (FARP). ADA protection of rear logistic facilities includes petroleum, oils, and lubricants (POL), ammunition, and maintenance areas. Other facilities may require ADA protection depending on the theater. Sustaining the battle also includes ensuring continuous operational availability of ADA systems and other Army ADA resources such as Class V (ammunition) and IX (parts) re-supply.

Destroy Enemy Aircraft and Missiles the First Time

1-28. Destroying enemy air and missile threats the first time sustains friendly combat power by denying enemy air attacks, and aerial ISR to prevent the destruction of friendly forces and assets. The combination of combat losses and effective passive measures erodes the enemy's expectation of successful air operations and disrupts enemy air and missile capability.

1-29. AMD operations must overmatch enemy capabilities to ensure the cost of enemy attack operations is prohibitive. AMD operations must achieve this objective early in the conflict and ensure ADA forces retain the capability to rearm, reconstitute, reorganize, and regenerate. There may be tactical situations and operations in which commanders restrict weapon systems from engaging enemy air to prevent fratricide, or support a deception.

MISSION-ESSENTIAL TASKS

1-30. The mission essential tasks for Army air defense (AD) are derived from Joint doctrine, Universal Joint Task List (UJTL), Army doctrine, Army Universal Task List (AUTL), Air Defense doctrine, lessons learned, METT-TC for employing ADA forces and operational requirements of the commanders. AMD mission essential tasks describe what well trained, superbly led, and well-equipped soldiers do to protect the force from enemy air attack. To accomplish the mission, ADA units must execute the following mission essential tasks described below:

- Homeland Defense.
- Theater Air and Missile Defense.
- Conduct Airspace Information Superiority Operations.
- Support Offensive Operations.
- Integrate with BMDS Operations.
- Army Airspace Management.
- Early Warning of Air and Missile Attack.

HOMELAND DEFENSE

1-31. -Army ADA forces provide critical capabilities to support Global Ballistic Missile Defense (GBMD) and Joint and interagency Homeland Air Security (HAS) operations (Figure 1-1). ADA forces will maintain dedicated command and control structured to plan, integrate, and coordinate Army ADA support to GBMD and HAS. Army ADA forces will support standing Ground-Based Midcourse Defense (GMD) by deploying tailored modular, scalable, multi-functional ADA task forces (TF). These capabilities will be part of a responsive, layered offensive and defensive system capable of deterring, preventing or defeating air and missile threats against the Homeland. GBMD forces will have connectivity, coordination, and integration with the ADA forces and activities fighting inside Joint Forces Commander's (JFC) Joint operations Area (JOA). Examples of such activities include attack operations or SOF launch point denial missions against long-range missiles, sharing of relevant sensor data, intelligence and early warning.

1-32. GMD systems are manned by joint personnel under the operational control of United States Northern Command (USNORTHCOM). GMD comprises the joint AD role in Ballistic Missile Defense System (BMDS).

1-33. The ground-based segments will include ground-based systems capable of destroying ballistic missiles during their midcourse flight phase in either the endo- or exo-atmosphere, at altitudes that will preclude ground effects of WMD/E to prevent collateral damage.

Army AMD Global Missile Defense & Homeland Air Security

AMD Intent (Ends)	AMD Required Capabilities (Ways)	JIIM Contributions needed (Means)	Army Contributions (Means)
Missile & Asymmetric Aerial attacks against Homeland & Allies *deterred* Options for the President and/or Secretary of Defense for offensive military operations *unaffected* by missile threats Enemy attempts to strike Homeland allies outside RCC's AOR with ICBMS, IRBMs Cms, *preempted or defeated*. Enemy attempts to strike Homeland w/asymmetric aerial attacks *preempted or defeated.*	STRATCOM planning and integrations of JIIM ISR, Global Missile Defense, Global Strike. NORTHCOM planning, integration of JIIM, Homeland Air Security Global Strike Layered, Global Missile Defense fires (boost phased mid-course) vs ICBMs, IRBMs, warheadsl Homeland Air Defense -Combined Air Patrols -Ground based air defense vs Homeland asymmetric air threats (Cms, commandeered aircraft, etc.)	JIIM IST Global Strike Boost Phase Killer Sea-Based Mid-Course Defense Coast Guard Joint Air Federal Aviation Administration SOF	AMD C2 embedded in STRATCOM, NORTHCOM Ground-based Mid-Course and Terminal Defense Army Space Mission-tailored Army AMD capabilities

Figure 1-1. Army GBMD/HAS

1-34. Homeland Air Security (HAS) operations. To support HAS operations, Army ADA forces will deploy tailored task forces to areas within the U.S. as part of a layered Joint and interagency integrated ADA network. Continental United States (CONUS) based operations require interagency coordination, limited public visibility, and tight rules of engagement to create unique deployment, employment, and execution challenges for ADA leaders and Soldiers. These ADA TFs will protect designated critical assets and symbols of national power such as the National Capitol, major cities, seaports, power-projection platforms, National Security Special Events (e.g., the Olympics and Super Bowl), and other critical elements of national infrastructure from aerial threats. In all of these situations, the ADA task forces will be integrated and networked with JIIM land, sea, air and space sensors and communications system elements to facilitate early warning, combat identification, long-range cueing, and target detection and to contribute to local situational understanding, airspace management, and the local protection stance.

THEATER AIR AND MISSILE DEFENSE

1-35. The JFC exercises control of AMD operations. The JFC integrates theater air and missile defense (TAMD) systems and forces into the command, control systems supporting theater air and missile defense. The JFC normally assigns overall responsibility for AMD to an area air defense commander (AADC). The commander of the Army Air and Missile Defense Command (AAMDC) supports the AADC for AMD operations as the deputy AADC for AMD (DAADC [AMD]).

1-36. The AAMDC is the Army's operational lead for Army AMD operations. The AAMDC is the senior Army ADA commander, and coordinator. The AAMDC organization is the command and control (C2), communications system, and intelligence headquarters for ADA forces in theater.

1-37. The AAMDC coordinates with joint and multinational partners to develop procedures for combined TAMD operations, interoperability, and training. The AAMDC is the focal point for TAMD intelligence support to Army component forces and other joint/multinational forces.

1-38. The AAMDC plans, coordinates, integrates, and executes AMD for the COCOM/Army forces (ARFOR) commander or the Combined/Joint Force Land Component Commander (C/JFLCC). TAMD operations include the following:

- Sharing TAMD intelligence preparation of the battlefield (IPB) information with the fires cell (FC) of the battlefield coordination detachment (BCD).

- Providing TAMD target nominations to the FC for immediate targeting of time- sensitive targets.
- Providing liaison officers (LNO) to accomplish the essential coordination needed to prosecute the TAMD fight.
- Provides the Air Defense Fire Control Officer (ADAFCO) to the air operations center (AOC) or regional air defense commander (RADC)/sector air defense commander (SADC) to support fire/engagement coordination with ADA TF elements.
- Coordinating with the higher echelon ADA unit defense designs to ensure that their respective operations are integrated and synchronized with the theater area air defense plan (AADP).

CONDUCT AIRSPACE INFORMATION SUPERIORITY OPERATIONS

1-39. Airspace information superiority operations involve collecting, processing, and disseminating an uninterrupted flow of airspace information while denying an enemy's ability to do the same. Airspace information superiority is the synergistic product of successfully executed Army, joint, multinational, and/or interagency command and control (C2), communications system, intelligence, surveillance, and reconnaissance (ISR) and enables precise, distributed, and agile force operations. Army ADA forces conduct airspace information superiority operations by employing ground-based sensors, elevated sensors, as well as communications system elements. These sensors, along with command and control (C2) enables real-time and near real-time situational awareness/situational understanding of the third dimension of the joint operational environment.

SUPPORT OFFENSIVE OPERATIONS

1-40. Army ADA forces support offensive operations by proactively destroying or disrupting enemy aircraft, unmanned aircraft systems (UAS), cruise missiles (CM), or ballistic missiles (BMs). To support offensive operations, ADA forces provide target-nominations on threat launch sites prior to or as soon as possible after launch to preclude influence on friendly operations. Army ADA, through its employment of sensor and communications system elements, will support offensive operations by providing timely tailored situational understanding to Army, joint and multinational strike elements, enabling them to destroy time-critical targets such as missile and UAS launch platforms and the supporting command and control and support infrastructure.

INTEGRATE WITH BMDS OPERATIONS

1-41. BMDS operations involve the employment of BMDS system capabilities to enhance C2, communications systems and intelligence, facilitate the maneuver of forces, and reduce the commander's uncertainty. BMDS operations complement air and missile defense operations, intelligence collection, and sustainment operations. Satellite-based sensors detect missile launches. Sensor data is processed and distributed by joint tactical ground stations (JTAGS). Information is passed through command structures to fully integrate ground-based missile defense (GMD) system operations to provide robust ADA capabilities worldwide.

ARMY AIRSPACE MANAGEMENT

1-42. Army airspace management involves identifying, coordinating, integrating and regulating Army airspace needs and users, and ensuring that airspace use is synchronized in time, space, and purpose interdependently with joint and multinational forces. Army ADA forces will employ air defense airspace management (ADAM) cells with the airspace control cells at selected echelons to support these operations.

EARLY WARNING OF AIR AND MISSILE ATTACK

1-43. Early warning involves disseminating air and missile attack warnings to forces, the President and Secretary of Defense and where appropriate, to civilian populations. Army ADA forces support early warning by employing sensors to detect air and missile attacks. Communications system elements (including JTAGS) process sensor data and employ communications networks to disseminate focused early warnings (and "all clear") only to at-risk forces, and when appropriate, to at-risk populations.

AIR DEFENSE IN RELATION TO THE ARMY OPERATIONAL CONCEPT

1-44. ADA, as an integral part of Army, joint, interagency and multinational forces, contributes to the force's ability to see first, understand first, act first, and finish decisively. The future Army ADA forces will possess the versatility, speed, capability and endurance to effectively execute and support simultaneous, multidimensional, distributed operations. The domination, enabling, exploitation, and protection of the third dimension permit the Future Force to be decisive at any point on the spectrum of joint military operations.

AIR DEFENSE IN FULL SPECTRUM OPERATIONS

1-45. The Army Operational Concept is Full Spectrum Operations (see FM 3-0, chapter 3, for more information). The elements of full spectrum operations are offense, defense, stability operations, and civil support operations. Army AMD operations support the operational concept through the application of the ADA employment principles and guidelines.

THEATER AIR AND MISSILE DEFENSE OPERATIONS

1-46. Theater air and missile defense (TAMD) operations are interdependent. Air defense targets include manned aircraft, CM, and UAS, while TAMD targets are comprised of theater missiles (TM). Theater missiles include ballistic missiles, cruise missiles and air-to-surface missiles within a given theater of operation.

1-47. The requirement to avoid fratricide of friendly aircraft mandates strict, highly centralized control of theater air defense engagements. The unique challenges posed by TAMD require a highly responsive command, control and communications (C2) structure permitting decentralized execution to the lowest engagement level. Enemy aircraft conducting attack operations against the force are vulnerable to defensive fires for extended periods of time while missile engagement opportunities are measured/conducted in seconds.

AIR AND MISSILE DEFENSE IN THEATER OPERATIONS

1-48. Army ADA plays a key role in joint counterair and TAMD operations at the strategic, operational, and tactical levels of war. Army ADA contributes to joint defensive counterair (DCA), joint offensive counterair (OCA), and TAMD operations during attack and defense operations. The Army ADA forces support joint operations by providing protection for critical maneuver forces and assets in the theater base or in the combat zone.

1-49. Unity of effort is achieved through integration and coordination of joint counterair (CA) and TAMD operations by the joint force air component commander (JFACC)/AADC/airspace control authority (ACA). The AADC contributes through the development and promulgation of JFC approved rules of engagement (ROE) and ADA positive and supplemental procedures and control measures.

1-50. Army ADA is supported by the integrated application of all combined arms. For offensive counterair (OCA) and TAMD attack operations, the Army executes deep operations through the Fires Cell primarily employing special operations forces (SOF), aviation and field artillery units to attack the enemy's ground based air and missile assets before they are launched against the JFLCC critical theater assets. Active defensive counterair (DCA) and TAMD active defense operations conducted by Army forces are in response to immediate enemy air, missile, and surveillance threats. The Army provides dedicated "mud to space" air and missile defense systems to protect the force and geopolitical assets and ensure the JFLCC's freedom to maneuver.

ARMY AIR DEFENSE ARTILLERY FORCES

1-51. Army ADA forces contain AAMDCs, ADA brigades, ADA battalions and ADA batteries. The ADA family of systems provides protection over the battle area, with each system having its own capabilities and limitations.

1-52. ADA commanders allocate forces based on the supported commander's priorities. The mission is broadly written to include protection of critical assets, installations, and facilities along with joint and multinational forces when required.

1-53. The Air Defense and Airspace Management (ADAM) Cell deploys worldwide with the Stryker brigade combat team (SBCT), brigade combat team (BCT) to—

- Plan, coordinate, and establish connectivity with JIIM sensors and communications system/controller networks, as well as airspace users.
- Provide aerial situational awareness and early warning.
- Conduct continuous planning and execution of airspace management requirements for the supported unit/echelon.
- Conduct AMD and Aviation planning and coordination to determine AMD and Aviation requirements across the full spectrum of operations.

1-54. The ADAM Cells are embedded within the echelon headquarters tactical operations centers to support their AMD and airspace management 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 regional 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.

THEATER

1-55. The focus at the theater level is on conducting joint or multinational operations and employing military forces to attain theater-strategic objectives in a theater of war and operational objectives in a theater of operations. The AAMDC is the theater level organization to which ADA brigades are assigned.

1-56. Patriot is employed to protect operational forces and assets from air and theater missile attack. ADA brigades and/or other ADA units may become involved in strategic or theater-strategic operations.

1-57. A BCT and its accompanying ADAM Cell can find itself as an integral component of an early entry force, as a part of a Division or Corps, or as a stand-alone unit. Soldiers assigned to a BCT or who support the BCT must train and be prepared to fight across the spectrum of conflict. 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 ARFOR or Army joint task force (JTF) headquarters within a joint or combined force command.

BRIGADE AND BELOW

1-58. ADA forces at brigade and below include both non-divisional and maneuver base systems. These systems are employed to protect operational forces and assets from air and missile attack. The ADA brigade commander advises the AAMDC commander on overall counterair and AMD integration, synchronization, and employment.

1-59. ADA Battalions can consist of Patriot batteries that are organized with a short-range air defense (SHORAD)/Avenger unit, forming an air defense battalion with an AMD mission. The battalions can be a Patriot (P), Avenger (A), or composite Patriot/Avenger (P/A). ADA battalions are flexible, allowing deployment as modular, scalable, mission tailored task forces that may consist of platoon, battery, or battalion-sized elements. Weapon system configurations are a combination of Avenger and Patriot. Plans are developed with contingencies for different sized and configured ADA task forces, as dictated by mission requirements. As combat theaters mature, additional modules of task force elements may be added to meet changing METT-TC requirements and to tailor the task force to the employment principles of mass, mix, mobility, and integration.

1-60. Unit of employment ADA forces will be force-pooled and flexible to respond to the needs of the Joint force, across the range of military operations, with appropriate mission tailored packages. Air and

missile defense forces will be habitually associated with organizations at each level, yet will possess the versatility to operate when and where required in support of the JIIM and Army team.

1-61. Air Defense Artillery forces will be scalable, modular, and tailorable. While recent conflicts have resulted in the deployment of the majority of Army ADA units, ADA forces can reduce the deployment footprint considerably for short durations or as METT-TC allows.

Air and Missile Defense in Forward-Based and Contingency Missions

1-62. Army forces conduct air and missile defense operations in forward-based and contingency missions both of which require integrated Army AMD planning.

Forward-Based

1-63. Characteristics of a forward-based mission include in-place commitments and alliances with joint and multinational forces. The mission typically contains a large number of high-value, fixed assets and a well-known threat. Because of the threat, counterair and TAMD forces are typically in place during peacetime for deterrence and wartime readiness.

Contingency Theaters

1-64. The contingency mission lacks the sophisticated command and control, logistics infrastructure, and in-place forces of the forward-based mission. Without adequate AMD protection, initial entry forces are susceptible to catastrophic damage in the initial stages of an operation.

1-65. Entry operations are usually short-duration operations, but may transition to protracted war. In the initial stages of the force-projection operation, there are normally few high-value assets. Counterair and TAMD forces must protect those assets to ensure the continued buildup and expansion of the lodgment area.

Chapter 2

Fundamentals of Army Air and Missile Defense Operations

This chapter describes the basic concepts inherent in air and missile defense operations which have been developed and improved through many years of operations, both combat and real world deployments. This includes employment principles and guidelines, and engagement operations principles.

AIR DEFENSE ARTILLERY EMPLOYMENT PRINCIPLES

2-1.   ADA employment principles (mix, mass, mobility, and integration) enable air defense forces to successfully perform combat missions and support overall force objectives.

MIX

2-2.   Mix is the employment of a combination of weapon and sensor systems to protect the force and assets from the threat. Mix offsets the limitations of one system with the capabilities of another and complicates the situation for the attacker. Joint, interagency and multinational ADA capabilities are considered when applying this principle. Proper mix causes the enemy to adjust their tactics. Enemy tactics designed to defeat one system may make the enemy vulnerable to another friendly system.

MASS

2-3.   Mass is the concentration of air defense combat power. It is achieved by assigning enough firepower to successfully defend the force or the asset against air and missile attack or surveillance. To mass air defense combat power in one area, commanders may have to accept risks in other areas of the battlefield. Mass may also be interpreted to include the launching of more than one interceptor against a target.

MOBILITY

2-4.   Mobility is defined as a quality or capability of military forces, which permits them to move from place to place while retaining the ability to fulfill their primary mission.

2-5.   ADA units move from place to place, and mass where needed while retaining the ability to fulfill the AMD mission. The mobility of supporting air defense resources is sufficient to provide continuous protection to a supported maneuver force on the move. Tactical situations may dictate frequent and rapid moves to enhance survivability of ADA and maneuver forces.

INTEGRATION

2-6.   Integration is the addition and fitting together of the forces, systems, functions, processes and information acquisition and distribution required to efficiently and effectively perform/support Army AMD and TAMD tasks. Integration combines separate systems, capabilities, functions, etc. in such a way that those individual elements can operate singly or in concert without adversely affecting other elements. Integration has three sub elements: functional, operational, and architectural integration.

2-7.   Functional integration consists of those activities associated with the definition, distribution, horizontal and vertical integration, and synchronization of TAMD functions into the Army's theater architecture. These activities are the basis for establishing both the information required and the means to acquire, produce, exchange and distribute that information for planning, coordination, decision, control, and execution purposes.

2-8. Operational integration consists of those activities associated with enabling and optimizing the performance and collective effectiveness and efficiency of theater air and missile defense (TAMD) within the total theater resources.

2-9. Architectural integration consists of those activities associated with establishing, assuring, and enhancing the information interchange within the TAMD component elements (organizations, weapons, and communications systems/components) and with the Army theater information architecture (hardware, software, operations, and personnel).

AIR DEFENSE ARTILLERY EMPLOYMENT GUIDELINES

2-10. Planning during defense design and positioning ADA units involves applying six employment guidelines. Optimum protection of the items on the JFC's Critical Asset List (CAL) must be the goal. The guidelines are mutual support, overlapping fires, balanced fires, weighted coverage, early engagement, and defense-in-depth. Defense planners apply these guidelines vertically and horizontally to account for the variety of altitudes and ingress routes from which the enemy can attack or conduct ISR operations.

MUTUAL SUPPORT

2-11. Mutual Support. Weapons are positioned so that the fires of one weapon can engage targets within the dead zone of the adjacent weapon systems. For gun systems, this dead zone is usually small. For missile systems, the dead zone may be large and mutual support is a critical element. Mutual support can also cover non-operational units or units at lower states of readiness.

OVERLAPPING FIRES

2-12. Overlapping Fires. Weapons are positioned so that their engagement envelopes overlap. Because of the many altitudes from which the enemy can attack or conduct surveillance operations, defense planners must apply mutual supporting and overlapping fires vertically and horizontally. It is desirable that overlapping fires be achieved as a minimum during defense design.

BALANCED FIRES

2-13. Balanced Fires. Weapons are positioned to deliver an equal volume of fires in all directions. This is necessary for air defense in an area where the terrain does not canalize the enemy or when the avenue of approach is unpredictable. However, it is also a desired characteristic of defense design.

WEIGHTED COVERAGE

2-14. Combining and concentrating weapons coverage (engagement area) toward the most likely enemy air avenues of approach or direction of attack achieve weighted coverage. Based on the tactical situation, a commander may risk leaving one direction of attack unprotected or lightly protected to weight coverage toward another direction. A risk assessment is recommended before this guideline is implemented.

EARLY ENGAGEMENT

2-15. Early engagement is achieved by positioning sensors and weapons so they can engage the enemy before aircraft ordnance release or friendly target acquisition by the enemy. Early engagements enable destruction of enemy platforms over enemy forces and unoccupied areas thereby reducing the possibility of friendly collateral damage and fratricide.

DEFENSE-IN-DEPTH

2-16. Defense-in-depth is achieved by positioning sensors and weapons so the enemy is exposed to a continuously increasing volume of fire as it approaches the friendly protected asset or force. Defense-in-depth decreases the probability that attacking missiles and aircraft will reach the defended asset or force.

TYPES OF DEFENSE

2-17. ADA forces provide area, point, and self-defense of assets located in their area of operations (AO).

AREA DEFENSE

2-18. Area defense uses a combination of weapon systems (for example, aircraft and surface-to-air-missiles [SAM]) to defend broad areas.

2-19. The best area defense is one that provides contiguous all-altitude area coverage throughout the depth of the defended area. Optimum area defenses are not always achievable because of the limited number of available ADA systems.

2-20. Force defense involves protecting maneuver forces (division/brigade/battalion) throughout full spectrum operations. Defense of maneuver forces by ADA includes protecting their support and sustainment capabilities. Avenger is the primary system used to protect maneuver forces. Depending on METT-TC, these systems and units can be task-organized to provide support to the maneuver force.

POINT DEFENSE

2-21. Point defense protects limited areas, normally a defense of vital elements of forces or installations. For example, a SAM unit positioned to protect an airfield is considered point defense. However, aerial ports of debarkation (APOD) / seaports of debarkation (SPOD) (/), logistics, communications, geopolitical and cultural assets throughout the combat zone (CZ) will most certainly require point defense protection. ADA systems such as Patriot and Avenger are used in this type of defense since they can provide air-breathing threat (ABT)/tactical ballistic missile (TBM) protection. There are two types of point defenses— a weighted defense and a balanced defense.

2-22. A weighted defense should be used only when there is a very high probability the attack will come from a particular direction and there are sufficient number of ADA systems/battalions available. The weighted defense is the norm for ABT/TBM defenses when the threat direction is known.

2-23. A balanced defense should be used when there are multiple avenues of attack from ABT/TBM threats and there are limited numbers of ADA systems available. Balanced defenses are planned and implemented by determining force allocations, task organizing when/and where appropriate, and by defining the zones and areas of responsibility within which battalions or task forces operate.

SELF DEFENSE

2-24. A combatant commander has the authority and obligation to use all necessary means available and to take all appropriate action to defend all U.S. forces in their vicinity from a hostile act or hostile intent. Force used should not exceed that which is necessary to decisively counter the hostile act or intent and ensure the continued safety of U.S. forces or other persons and property they are ordered to protect. U.S. forces may employ such force in self-defense only so long as the hostile force continues to present an imminent threat. However, engagement of a self-defense target may be denied at the discretion of the engagement authority.

ALERT STATUSES AND WARNINGS

2-25. Alert statuses and warning procedures provide information to forces, units, and weapon systems to the presence and general location of unidentified and hostile forces. Receipt of this information causes units to prepare for action. Warning procedures and alert statuses have specific application for ADA forces.

DEFENSE READINESS CONDITIONS

2-26. Defense readiness conditions describe progressive alert postures primarily for use between the Joint Chiefs of Staff and the commanders of unified commands. Defense readiness conditions are graduated to match situations of varying military severity, and are numbered 1-5 as appropriate.

WEAPONS ALERT DESIGNATORS

2-27. Weapons alert designators (WADs), Table 2-1, describe a progressive system of alert postures. They are used by the ADA commander to specify minimum percentages of ADA fire units within parent organizations that are required to be at given states of readiness. ADA commanders use weapons alert designators to condition systems to meet the enemy threat, provide time for maintenance, and allow crew rest.

Table 2-1. Notional ADA weapons alert designators

WAD	RTF	5 min	15 min	30 min	1 Hour (or more)
A	ALL				
B	80%	10%	10%		
C	60%	10%	20%	10%	
D	40%	20%		20%	20%
E	30%				70%
Note: x% = % of fire unit at each readiness condition. RTF = Ready to Fire.					

ALERT STATES

2-28. Alert States provide guidance to commanders on how to configure their system when used in conjunction with the surface-to-air missile tactical order (STO) and Emissions Control (EMCON) authority. The alert state defines a battery's readiness posture. The proper use and execution of the alert state results in units achieving a directed readiness posture.

2-29. ADA commanders use WAD, and alert state to ready the force/systems in a rapid logical way for action against the enemy while retaining the ability to stand down units for rest or maintenance (relief in place). ADA battalion commanders establish and control the alert state for subordinate batteries, platoons, and fire units. Alert state drive personnel manning requirements to support the schedule. Table 2-2 **(classified when filled in)** is an example of alert states for Patriot units; other systems may/will vary. Actual timelines and manning requirements are determined by theater plans or unit tactical standing operating procedures (TSOPs) taking into account the factors of METT-TC.

Table 2-2. Alert state

ALERT STATE TABLE					
AS	RS STATE	LS STATE			COMMO
		LOCAL	STANDBY	OPERATE	
1	ABT				ALL AVAIL
2	TBM				ALL AVAIL
3	PASSIVE				ALL AVAIL
4	RADIATE DISABLE				ALL AVAIL
5	CDR's DISCRETION				UHF / FM
6	MAINTENANCE				FM
7	DESTROYED / NMC				FM
0	MOVING / TRANSITION				FM

- Local: LS Powered UP, Green DDL, Key in LOCAL, Torque Tubes locked, missiles electrically disconnected and missile heaters off.
- Standby: LS Powered UP, Green DDL, Key in REMOTE, Torque Tubes unlocked, missiles electrically connected and missile heaters on.
- Controlling Authority = STO Issuing Authority and EMCON authority.
  - During training, torque tubes will remain locked and safety wired. Missile heaters will remain off.
  - The controlling authority will identify the minimum number of launchers required in the appropriate column under LS State.
  - PATRIOT units require at least four hours of daily maintenance.

AIR DEFENSE WARNINGS

2-30. The Air Defense Warning (ADW) states the probability of air raid based on the threat assessment and their IPB. The AADC establishes the baseline ADW for the joint force, which may be different for an air breathing threat and a missile threat. Subordinate air defense commanders may issue higher, but not lower ADW for their region or sector. ADWs are disseminated though C2 channels to all air and missile defense elements and fire units.

- **ADW Red:** An attack by hostile aircraft or missile is imminent or in progress.
- **ADW Yellow:** An attack by hostile aircraft or missile is probable.
- **ADW White:** An attack by hostile aircraft or missile is improbable.

AIR DEFENSE EMERGENCY

2-31. Air defense emergency is an emergency condition, declared by the Commander, North American Aerospace Defense Command. It indicates that attack upon the continental U.S., Canada, or U.S. installations in Greenland by hostile aircraft or missiles is considered probable, is imminent, or is taking place.

RULES OF ENGAGEMENT

2-32. Rules of engagement (ROE) are the positive and procedural management directives that specify the circumstances and limitations under which forces will initiate or continue combat engagement with enemy forces. The joint standing ROE is found in the Chairman of the Joint Chiefs of Staff instruction CJCSI 3121.01B.

2-33. The JFC approves the theater ROE. These established ROE enable the AADC to retain control of the air battle by prescribing the exact conditions under which engagements may take place. ROE apply to all warfare participants in the theater and are disseminated to all echelons of air, land, and sea forces. There are seven ROE categories. The first three ROE are applicable to all air defense contributors. The others are primarily for ADA forces. The seven categories of ROE are as follows:

- Right of self-defense.
- ID criteria.
- Weapons control status.
- Level of control.
- Modes of control.
- Autonomous operations.
- Fire control orders.

RIGHT OF SELF-DEFENSE

2-34. **Obligation and Responsibility for Defense.** Every commander has the inherent right and obligation to use all necessary means available and to take all appropriate actions in self-defense of the commander's unit and other U.S. forces in the vicinity in response to a hostile act or demonstrated hostile intent.

2-35. Commanders at all echelons must take whatever action is necessary to protect their forces and equipment against air or missile attack. When under attack, the right of self-defense takes precedence over any other established rules and procedures that normally govern engagements unless self-defense has been denied.

IDENTIFICATION CRITERIA

2-36. The employment of defensive weapon systems requires early identification of friendly, neutral, or hostile aircraft and missiles to maximize beyond-visual-range engagement and avoid fratricide. This requires a clear understanding of the rules of engagement (ROE). The problem of distinguishing friendly, neutral, and enemy assets while employing various weapon systems against the enemy is a highly complex task for some threats. However since ballistic missiles have a distinct flight profile, ROE for this threat should allow immediate engagement. The AADC and ACA establish procedures within the airspace control system to positively identify all airborne assets, and permit active air defense. Active air defense measures reduce delays in operations, and prevent fratricide. Positive identification (ID) of tracks is normally the preferred method of operation. In the absence of positive ID, procedural ID is used, which employs previously established and promulgated airspace coordinating measures. Procedural ID separates airspace users by geography, altitude, heading, time, and/or maneuver. Generally, some combination of positive and procedural ID will be used.

2-37. Hostile criteria are basic rules that assist in the identification of friendly or hostile air platforms fixed wing/rotary wing (FW/RW) aircraft, CMs, and UAS. These rules are promulgated by the commanders of unified commands and by other appropriate commanders when so authorized. The commander who establishes hostile criteria parameters may consider the factors of speed, altitude, and heading or other requirements within specified volumes of airspace. The local commander may also consider specific enemy threat characteristics or hostile acts.

2-38. Echelons having identification authority use hostile criteria to determine the identification of detected air targets. The highest echelon capable of managing engagement operations normally retains identification authority. Upon target detection, fire units with near-real-time data transmission capability assist the controlling authority by forwarding target information. The controlling authority makes final target identification and delegates engagement authority. Delegation of controlling and identification authority to lower echelons is normal for ADA units. Such units have both identification and engagement authority. ADA units engage inbound ballistic missiles based on classification, not identification.

WEAPONS CONTROL STATUS

2-39. Weapons control statuses (WCSs) include free, tight, hold/safe. They describe the relative degree of control of air defense fires. The AADC establishes the WCS for the joint force, which may be different for an air breathing threat and a missile threat. This authority originates with the AADC and can be delegated to any subordinate commander. Different weapons control statuses may be applied simultaneously to different weapons systems, and/or volumes of airspace.

- **Weapons Free:** Weapons can fire at any air target not positively identified as friendly. This is the least restrictive weapon control status.
- **Weapons Tight:** Fire only at air targets that are identified as hostile according to the prevailing hostile criteria. Identification can be effected by a number of means to include visual identification (aided or unaided), electronic, or procedural means. Capabilities dictate that ADA units engage threatening ballistic missiles and air-to-surface missiles (ASM) based on classification, not identification.
- **Weapons Hold:** Do not fire except in self-defense or in response to a formal order. This is the most restrictive weapon control status.

LEVEL OF CONTROL

2-40. Level of control describes the ADA echelon at which positive management of the air battle is conducted. This can be an AADC, RADC, SADC, ADA brigade, battalion, or individual fire unit. This is the level that has engagement authority. Different levels of control may be established for fixed-wing aircraft, rotary-wing aircraft, UAS, and theater missiles. The AADC will specify the level of control in the AADP and this may change over the course of an operation.

MODES OF CONTROL

2-41. There are two modes of control, centralized and decentralized. The mode of control selected will depend upon the capabilities of the communications system, the weapons systems employed, and both the friendly and enemy air situations. The AADC's AADP specifies the modes of control, trigger events and when they should be changed, and who has the authority to change them.

2-42. **Centralized Control Mode.** In this mode, a higher echelon authority assigns target engagements to fire units. In some circumstances, fire units seek permission to engage targets by requesting authorization from that higher air defense echelon. Centralized control is used to minimize the likelihood of engaging friendly aircraft while permitting engagements of hostile aircraft and missiles only when specific orders are issued to initiate the engagement.

2-43. **Decentralized Control Mode.** In this mode, higher echelon monitors unit actions to make direct target assignments on a management by exception basis, to prevent engagement of friendly air platforms, and to prevent simultaneous engagements of hostile air targets. Decentralized control is used to increase the likelihood that a hostile aircraft or missile will be engaged as soon as it comes within range of an ADA weapon system.

AUTONOMOUS OPERATIONS

2-44. A unit assumes autonomous operations after it has lost all communications with higher echelons. The unit commander assumes full responsibility for control of weapons and engagement of hostile targets. Normally, the rules of engagement and supplemental fire control measures in effect at the time of communications loss remain in effect until communications are regained. Changes to rules of engagement and supplemental fire control measures scheduled to go into effect after communications are lost, will be implemented as scheduled.

FIRE CONTROL ORDERS

2-45. Fire control orders are commands that are used to control engagements on a case-by-case basis, regardless of the prevailing weapons control status. Higher ADA echelons, when monitoring the decentralized operations of subordinate units, most often use these commands. Fire control orders can be

transmitted electronically or verbally; however, not all of the fire control orders explained below can or will be used by every type of ADA unit.

- **ENGAGE** is an order issued by the engagement authority to engage a specified target with the intent to destroy it. An engage order will be acted upon under any weapons control status. This order cancels any previous fire control order that may have been given on that target.

- **HOLD FIRE** is an emergency fire control order to stop firing or not to open fire on the target specified. Missiles already in flight must be prevented from intercepting by diversion or destruction, if technically possible.

- **CEASE FIRE** is a fire control order instructing ADA units to refrain from firing on, but to continue to track, an airborne object. Missiles in flight are allowed to continue to intercept. This fire control order is normally issued to preclude engagement of the same aircraft by two or more weapons systems.

- **CEASE ENGAGEMENT** In air defense, a fire control order used to direct units to stop the firing sequence against a designated target. Guided missiles already in flight will continue to intercept

- **ENGAGE HOLD** is an order applicable to Patriot only. When operating in the automatic mode, ENGAGE HOLD prevents engagement of the specified target by the system. This command is effective only when used prior to the expiration of the operator override time. It is used to increase the operator review time prior to an automatic engagement. Missiles in flight are allowed to continue to intercept.

- **STOP FIRE** is an emergency order to temporarily halt the engagement sequence due to internally unsafe fire unit conditions. It is seldom transmitted outside the fire unit. This command can be given by anyone in the fire unit who detects an unsafe condition. The engagement may continue after the unsafe condition has been corrected.

- **COVER** is an order maintaining a continuous receiver watch with transmitter calibrated and available, but not necessarily available for immediate use. Cover can also be defined as a fire control order that allows an adjacent fire to automatically engage a target if the primary fire unit misses or does not destroy the target.

SECTORS OF FIRE AND PRIMARY/SECONDARY TARGET LINES

2-46. Sectors of fire for ADA fire units are normally designated at battalion after review of radar coverage diagrams. Primary target lines (PTLs) are established along the centerline of the assigned sector of fire to assist in the distribution of ADA fires.

2-47. Secondary Target Lines (STLs) are established to supplement the effects of the fire unit to defend adjoining areas on both sides of the PTL.

2-48. These limits must be clearly defined by right and left boundaries. Those ADA units with automated tactical data systems must know whether they are to assign and engage air targets within or beyond the stated sector boundaries.

METHODS OF FIRE

2-49. The available operational environment and level of protection will determine the method of fire used by engaging fire units. Methods of fire, depending on the ADA system, include shoot-look-shoot (SLS), ripple, and salvo.

- **Shoot-look-shoot** — After the first shot has been fired the operator/gunner/system evaluates the engagement. If the target is not destroyed and the operational environment permits, another shot may be fired.

- **Ripple**—Ripple is a method of fire used for BMs and is slightly different than that used for aircraft. The time delay between firings for TBM is very small, while the firing delay for aircraft is seconds.

- **Salvo**—Salvo is a method of engagement in which the two missiles are fired simultaneously from different launchers. This method is used if there is insufficient time for SLS engagement. Salvo method of fire is used for BMs or against self-defense threats.

AIRSPACE COORDINATING MEASURES

2-50. Airspace coordinating measures (ACMs) are measures employed to facilitate the efficient use of airspace to accomplish missions and simultaneously provide safeguards for friendly forces. Army commanders request the establishment of ACMs through airspace command and control (AC2). The approval authority for ACMs is normally the ACA. The ACA is the commander designated to assume overall responsibility for the operation of the airspace control system. The ACA promulgates the measures using airspace control orders (ACO) and special instructions (SPINS). ACMs are discussed in the following paragraphs.

AIR DEFENSE OPERATIONS AREAS

2-51. Air defense operations areas (ADOAs) are the areas and the airspace above them within which procedures are established to minimize mutual interference between air defense and other operations. The following areas or zones are air defense operations areas.

Air Defense Action Area

2-52. Air defense action areas are volumes of airspace within which defensive counterair aircraft and ADA weapons are given precedence in operations. This type of ADOA is used to minimize mutual interference between friendly aircraft and ADA weapon systems. ADOA, which have been prioritized for ADA weapons, are similar to restricted operations areas for aircraft, except that ADOA are normally in effect for longer periods of time.

Air Defense Battle Zone

2-53. Air Defense Battle zone is areas of airspace around a firing unit or defended area, with identified altitude, and range in which fires are conducted.

Air Defense Identification Zone

2-54. The air defense identification zone (ADIZ) is airspace of defined dimensions within which the ready identification, location, and control of airborne vehicles are required. The ADIZ encompasses that volume of airspace in which friendly aircraft must have their identification friend-or-foe (IFF) equipment on and operating.

High-Density Airspace Control Zone

2-55. The high-density airspace control zone (HIDACZ) comprises airspace designated in an airspace control plan or airspace control order in which there is a concentrated employment of numerous and varied weapons and airspace users. A HIDACZ has defined dimensions, which usually coincide with geographical features or navigational aids. The maneuver commander normally controls access to the HIDACZ. The maneuver commander can also direct the weapons control status within the HIDACZ.

Weapon Engagement Zones

2-56. In air defense, airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with a particular weapon system.

2-57. Weapon engagement zones (WEZs) identify volumes of airspace of defined dimensions within which a specific type of ADA weapon is preferred For example, a WEZ can be established for manned aircraft to engage attacking fighters, and missiles and UAS could still be engaged within the WEZ by ADA weapons for use in an engagement. Use of a WEZ does not preclude engagement of high-priority targets by more than one type of weapon system if centralized control of each weapon system involved is available. The

activation of a WEZ can be used to delegate identification and engagement authority. The WEZ can be used for specific threats.

2-58. An activated WEZ supplements ADA hostile criteria and is used to make target assignments and engagement decisions. ADA engagements within an activated WEZ may be conducted regardless of the level of control; weapons control status, or hostile criteria in effect outside the activated WEZ. The echelon controlling engagements may engage targets without further permission from the establishing authority of the WEZ if the targets meet specified hostile criteria. Commonly used WEZ are listed below:

- **Fighter Engagement Zone (FEZ).** In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with fighter aircraft.
- **Missile Engagement Zone (MEZ).** Missile Engagement Zones are volumes of airspace reserved for engagements by Patriot. Within a MEZ Patriot may conduct engagements without specific direction from the authority establishing the WEZ.
- **High-altitude Missile Engagement Zone (HIMEZ).** In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with high-altitude surface-to-air missiles.
- **Low-altitude Missile Engagement Zone (LOMEZ).** In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with low- to medium-altitude surface-to-air missiles.
- **Short-range Air Defense Engagement Zone (SHORADEZ).** In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with SHORAD weapons. It may be established within a low- or high-altitude missile engagement zone.

*Note***:** SHORADEZ are established to cover areas where maneuver ADA systems are deployed. A SHORADEZ may fall within a MEZ, but it is also possible that maneuver ADA assets may provide the sole defensive ADA capability for some areas. A SHORADEZ can be established to define the airspace within which maneuver ADA forces conduct engagements. Centralized control over SHORAD air defense weapons may not be possible; therefore, these areas must be clearly defined so that friendly aircraft can avoid them.

- Joint Engagement Zone (JEZ). In air and missile defense, a JEZ is airspace of defined dimensions within which multiple air defense weapon systems (surface-to-air missiles and fighters) of one or more service components are simultaneously employed and operated to engage air threats.

TEMPORARY AIRSPACE RESTRICTIONS

2-59. Temporary airspace restrictions can be imposed on segments of airspace of defined dimensions in response to specific situations and requirements. These can include close air support (CAS) operations, air-refueling areas, and concentrated interdiction areas. Implementation of temporary restrictions includes the following:

- Identification of the airspace user being restricted.
- Time period, area, and altitude of restriction.
- Procedures for cancellation or modification of the restriction in event of communications loss.

2-60. Five common temporary airspace restrictions are: restricted operations areas, minimum risk routes, coordinating altitudes, standard-use Army aircraft flight routes, and weapons free zone. They are discussed in the following paragraphs.

Restricted Operations Areas

2-61. Restricted Operations Areas identify airspace of defined dimensions within which the operation of one or more airspace users is restricted for a fixed time period. The ACA establishes these areas in response to the requests of ground force commanders. The maneuver unit commander has complete weapons control status authority within an activated restricted operations area.

2-62. Restricted operations areas for aircraft and missiles are established to maximize ADA effectiveness. In such cases, the normal ADA weapons control status is WEAPONS FREE. Conversely, restricted operations areas for ADA can be established to support friendly air and Army aviation operations. In such cases, the normal ADA weapons control status is WEAPONS HOLD.

Minimum Risk Routes

2-63. Minimum risk routes (MRR) are temporary corridors of defined dimensions passing in either direction through ADA defenses, HIDACZ, or through restricted operations areas. MRR are designated to reduce risk to high-speed aircraft transiting the tactical operations area at low altitudes.

Coordinating Altitudes

2-64. Coordinating altitudes are procedural airspace control methods that separate fixed-and rotary-wing aircraft by determining an altitude below which fixed-wing aircraft will normally not fly and above which rotary-wing aircraft normally will not fly. Coordinating altitudes are specified in the airspace control plan and may include a buffer zone for small altitude deviations.

Standard-use Army Aircraft Flight Routes

2-65. Standard-use Army Aircraft Flight Routes are temporary air corridors of defined dimensions established below the coordinating altitude to allow the Army commander to safely route movement of aviation assets performing combat support and combat service support missions. They normally are located in the corps through brigade rear areas but may be extended to support logistics operations. Air corridors are restricted routes of travel specified for use by Army aviation and established to prevent friendly forces from firing on friendly aircraft.

2-66. The weapons control status for ADA fire units whose engagement ranges intercept an activated standard-use Army aircraft route or air corridor remains at WEAPONS TIGHT for that part of the route or corridor. Should it become necessary to change to WEAPONS FREE, the commander who established it, would close that particular route.

Weapons Free Zones

2-67. Weapons Free Zones**.** A weapons free zone is established for the protection of key assets or facilities other than air bases. Within these zones weapon systems may be fired at any air target not positively identified as friendly.

AIRSPACE COMMAND AND CONTROL (AC2)

2-68. The JFC normally designates an ACA, which has overall responsibility for establishing and operating the airspace control system. The air defense coordinator receives and distributes the relevant data from the airspace control order (ACO) and air tasking order (ATO) to the AC2 elements. Airspace coordinating measures (ACM) are procedural and positive controls used to synchronize military air operations above the AO. Synchronizing airspace enhances command and control for Army forces using airspace. See Table 2-3 for definitions of airspace terms. For more information, see FM 3-52.

Table 2-3. Airspace definitions

Airspace command and control (AC2)—The application of airspace control to coordinate airspace users for concurrent employment in the accomplishment of assigned missions.
Airspace control authority (ACA)—The commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area.
Airspace control order (ACO)—An order implementing the airspace control plan that provides the details of the approved requests for airspace control measures. It is published either as part of the air tasking order or as a separate document.
Airspace control plan (ACP)—The document approved by the joint force commander that provides specific planning guidance and procedures for the airspace control system for the joint force area of responsibility/joint operations area.

2-69. The ground commander manages the airspace below the coordinating altitude, using procedural and positive control measures to air traffic above the AO. Corps and divisions routinely have AC2 responsibilities although a commander may provide the resources to accomplish this function to a brigade operating independently. The AC2 element at each echelon provides airspace requirements through proper channels to the BCD at the joint air operations center (JAOC) for incorporation into the ACP.

2-70. The ADAM Cells conduct coordination within the AC2 element and participate in the planning process. The ADAM Cell supports planning coordination by checking the following AC2 tasks–

- Ensure that the AMD portion of the AC2 plan is developed.
- Involve the air and missile defense coordinator (AMDCOORD) /LNO in the AC2 planning process.
- Provide locations of ADA forces on the battlefield.
- Provide maneuver ADA information that supports the maneuver unit's AC2.

Chapter 3

Command and Control

This chapter addresses Command and Control in AMD operations and conforms to Joint Air and Missile Defense doctrine as updated with the lessons learned in Operation Iraqi Freedom (OIF).

BATTLE COMMAND

3-1.   Battle Command is the art and science of understanding, visualizing, describing, directing, leading, and assessing forces to impose the commander's will on a hostile, thinking, and adaptive enemy. Battle command applies leadership to translate decisions into actions—by synchronizing forces and warfighting functions in time, space, and purpose—to accomplish missions. Battle command is guided by professional judgment gained from experience, knowledge, education, intelligence, and intuition. It is driven by commanders.

3-2.   Battle Command for ADA is the conduct of tactical and operational decision-making as part of the real time engagement control and timing of sensor and weapons tasking. It is based upon the automated combination or fusion of data from various sensors, and the application of the existing ROE and supporting Battle Command directives and restrictions.

3-3.   Commanders must conduct risk assessments and implement risk management to define and support the needs of subordinates and seniors. Commanders go where they can best influence the battle, where their moral and physical presence can be felt, and where their will to achieve victory can best be expressed, understood, and acted upon.

ENGAGEMENT AND FORCE OPERATIONS

3-4.   Battle Command for Army ADA is grouped into two main categories: engagement operations (EO) and force operations (FO). EO and FO are interrelated and interdependent. A real-time interaction takes place between EO and FO during battle. This interaction results in continued force optimization as the battle progresses. EO and FO are assisted through automation. EO is conducted in seconds and minutes. FO may take hours and days to accomplish.

COMMUNICATIONS

3-5.   Reliable communications are imperative for ADA systems conducting Battle Command during the air battle. Effective Battle Command requires reliable signal/communications support to enable the ADA commander to conduct AMD operations during stressing tempo situations for extended time durations over extended distances. The commander must retain the flexibility to deploy ADA fire units across the battlefield and to maintain communication links with the C2 elements and to maintain access to time-sensitive data to influence the commanders' battle.

3-6.   Seamless, integrated secure communications networks provide for the horizontal and vertical integration of voice, data, graphics, imagery, and video information. Integrated networks support combat operations with the purpose of keeping the ADA commander informed. This means connectivity to joint streamlined communications links, global connectivity of extended-range assets, and integrated communications. These networks must connect to existing joint, interagency, intergovernmental, and multinational (JIIM), operations, forces, intelligence sources, logistics centers, and support administrative functions. Communications networks provide entry at key points within the force structure to facilitate the single integrated air picture (SIAP) and common operational picture (COP) data exchange through

automated routing capabilities and supports filtering of information that can be used by ADA commanders during the conduct of AMD operations.

3-7.   Space-based systems provide ADA commanders with intelligence, surveillance, reconnaissance (ISR) navigation and positioning information, early warning, and weather, terrain, and environmental monitoring. Satellite communications support all battlefield systems to significantly enhance the speed and accuracy of useful information that commander's exchange with subordinates.

3-8.   Tactical information is communicated among commanders, staffs, crews, and weapon systems. ADA commanders have the capability to communicate their intent while moving freely about the battlefield. Electronically linked with command posts, commanders are able to access time-sensitive operational and intelligence information to assess and influence the battle at the critical time and place in support of decisive operations. The AAMDC supports top-level connectivity to the battlefield (see Figure 3-1).
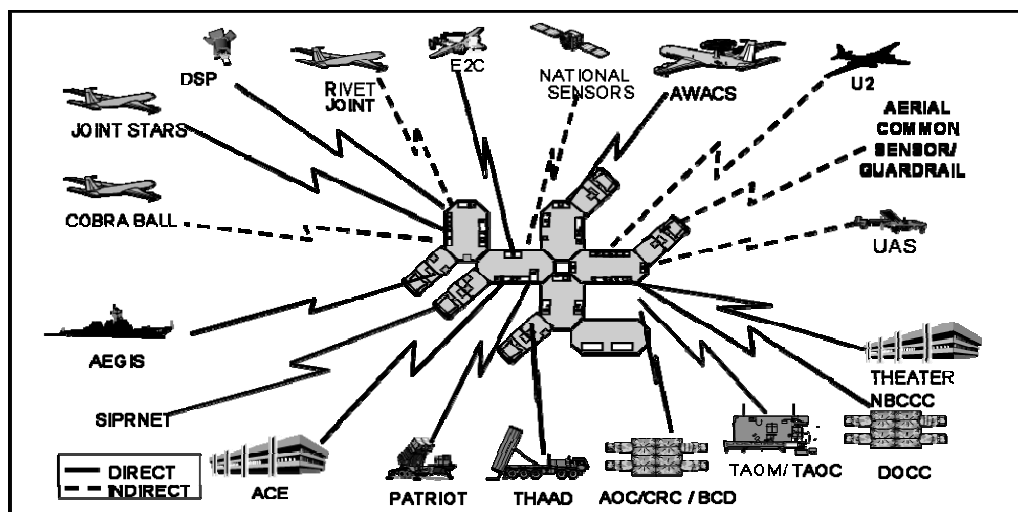
Figure 3-1. AAMDC connectivity

COMMUNICATIONS AND COMPUTERS

3-9.   Effective control of diverse systems requires the capability to collect, process, display, and communicate large amounts of information while denying the enemy access to the information. Communications systems, including space-based resources, are capable of providing secure near real time exchange of essential information between the joint force commander and subordinate commanders and forces. The systems are sufficiently flexible and responsive to allow timely redirection of forces. Communications systems must have sufficient capacity, electronic protection, and flexibility to accommodate information exchange among all levels of command, even when an intermediate level has been disabled (degraded operations).

3-10. Computers speed the exchange of essential information; it may be necessary to filter/parse the extent and type of information given to specific command and control levels. Data transferred between command and control levels to exercise JTAMD tasks calls for automated data processing. These systems must have alternative backup capabilities to maintain continuity of operations should the primary system fail.

Intelligence

3-11. Intelligence systems provide current, accurate, and timely all-source information of enemy capabilities and activities. These systems are integrated and synchronized to ensure responsiveness to operational needs. Intelligence systems accommodate a variety of different armed forces (national, allied, or coalition) communications systems. Intelligence systems are vital to the decision-making cycle and

support the status, assessment, planning, warning, and IPB (both land and air) functions as well as target prioritization recommendations.

Capabilities

3-12. Communications and ISR systems must rapidly disseminate intelligence to the JIIM forces and support air, sea, and ground attack operations requirements with a rapid targeting capability. Communications and ISR for AMD operations is integrated into the overall theater communications network, but supports decentralized control or autonomous operations. Service organizations conducting AMD operations maintain an interface with and are interoperable with the other JIIM organizations.

3-13. Offensive operations within theaters may have constraints or limitations requiring a reactive Communications and ISR process. Extensive Communications and ISR preparation and preplanning using continuous air and ground IPB provide critical targeting data.

Theater Missile Intelligence

3-14. Theater missile intelligence provides near real time data on enemy TM forward operating bases, missile launch, load, and hide sites, EW systems, Communications and ISR facilities, surveillance and control systems, and logistical support and infrastructure. The intelligence process detects and disseminates signatures that indicate possible enemy missile launch preparations and pass the launch warning to friendly units for decisive operations.

3-15. National or theater sensor and surveillance assets may search areas that will then require more refined ISR. Friendly aerial reconnaissance, ground surveillance systems, and other intelligence assets are rapidly cued to achieve the necessary accuracy for IPB targeting objectives.

3-16. Once a launch is observed, the preparation and planning measures provide a capability for concurrent and simultaneous defensive and offensive response. An enemy missile launched through a sensor and surveillance system's field of view keys the Communications and Intelligence process. This process enables communication interfaces to provide near real time defensive and offensive attack responses. . Concurrently, launch warnings are provided to all units and commands within the theater as part of passive defense.

3-17. Simultaneously while enemy missiles are in flight, updated enemy launch locations, predicted impact areas, and target data, information is passed to the appropriate command and control centers and offensive systems.

TACTICAL OPERATIONS

3-18. Tactical operations include 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. Passive defense support functions include early warning and missile defense warnings. 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 track data and engagement commands.

3-19. All airborne objects within the area of operation are quickly and accurately identified to effectively protect the force and control airspace. Air tracks will be identified as friendly, unknown or hostile according to the established criteria and procedures for identifying aircraft operating in an established area of operations. Friendly or hostile identification may be assigned to an established air track from the controlling authority or through the use of the following:

- Electronic interrogation.
- Air Tasking Order (ATO) information.
- Airspace coordinating measures.
- Point of origin, prior coordination.

- Voice authentication.
- Direction of threat.
- Positive visual identification.

3-20. Unknown identification is given to air tracks that do not meet criteria for a friendly or hostile. These tracks are continuously monitored through electronic or visual means. Classification of enemy missile threats may be sufficient in most cases to declare them hostile.

3-21. The AADC will specify the level of engagement authority in the AADP and this may change over the course of an operation. The engagement authority is the lowest echelon at which the available information on a track or surface target is evaluated against the rules of engagement (ROE) and the engagement decision is made. Within the same AO the AADC may delegate engagement authority to different echelons for fixed-wing aircraft, rotary-wing aircraft, UAS, and theater missiles.

FORCE OPERATIONS PROCESSES

3-22. ADA FO processes include planning, coordinating, preparing, and sustaining the total AMD mission. The situation analysis process continuously collects and evaluates all available information on friendly and hostile forces, including the intelligence tasks of continuous IPB and situation development. The defense planning process develops and assesses various options and produces a preferred course of action. The coordination process implements the cooperative actions required for developing, distributing, and executing AMD plans. The directives and orders process promulgates plans in a timely manner. The monitoring and controlling process involves observing and recording activities taken in response to orders issued and performing alerting based on the situation. Predictive EO algorithms will use FO information from the situation analysis process as the basis for recommending or directing EO activities.

ENGAGEMENT OPERATIONS PRINCIPLES

3-23. Effective Battle Command enables air defense forces to successfully perform combat missions and support overall force objectives. The following fundamental principles form the basis for air defense engagement operations–

- Centralized control with decentralized execution.
- Air battle management.
- Management by exception.

CENTRALIZED CONTROL WITH DECENTRALIZED EXECUTION

3-24. Centralized control with decentralized execution permits the full exploitation of the combat effectiveness of air defense operations at each level of command. Centralized control is the mode whereby a higher echelon makes direct target assignments to fire units. Centralized control ensures unity of effort. Decentralized execution gives subordinate commanders the flexibility that is essential to achieve the Operational Concept elements of initiative and speed.

3-25. Centralized control is essential to ensure integration and control of all air defense assets from the ADA brigade down to the ADA fire unit to maximize their collective effect on the AO. Centralized control also facilitates the synchronization of offensive and defensive operations within the Army and among all the participants in joint or multinational operations. In the case of Army AD, centralized control is executed through compliance with theater ROEs and ADA weapon control procedures and measures. Data link connectivity and operational control complete the synchronization.

3-26. Decentralized execution is necessary because the number of activities associated with air defense operations prevents any one commander from effectively controlling all air defense forces and actions. Decentralized execution also enables air defense assets to maximize their individual capabilities and meet the extreme engagement timelines associated with countering air and missile threats. Thorough planning and extensive coordination link centralized control and decentralized execution.

AIR BATTLE MANAGEMENT

3-27. Air battle management controls engagements of air targets, ensures the early ID of friendly, neutral, or hostile aircraft and missiles, destroys enemy aircraft and missiles, and maximizes Beyond- Visual-Range (BVR) engagements to prevent fratricide and unnecessary multiple engagements. The preferred method of operation is positive identification, in the absence of positive ID procedural ID is used. Procedural ID employs both promulgated and established airspace control measures. Procedural ID separates airspace users by geography, altitude, heading, time, and/or maneuver. Management of the air battle normally employs a mix of positive and procedural control measures and information management.

MANAGEMENT BY EXCEPTION

3-28. The principle of management by exception reinforces the theme that no one commander can direct the overall air defense battle on a real-time basis. If a unit is operating in the decentralized mode of control for engagement operations, a higher echelon Battle Command node monitoring the air battle may make direct target assignments to that unit on a management by exception basis. This would be done only when necessary to ensure proper fire distribution, prevent engagement of friendly air platforms, and prevent multiple engagements of hostile air targets.

JOINT COMMAND STRUCTURE

3-29. The joint command structure consists of multiple levels with varying degrees of involvement. Within this structure, there are multiple organizations and singularly designated responsibilities peculiar to ADA command structure.

COMBATANT COMMANDERS

3-30. Combatant commanders command one of the 10 unified combatant commands authorized by the President in the Unified Command Plan. They are further divided into six Geographic Combatant Commands and four Functional Combatant Commands. The Geographic Combatant Commanders are responsible for ensuring that AMD plans and operations of subordinate forces are integrated at theater level and documented in the appropriate operations plans and annexes. USSTRATCOM is responsible for synchronizing those plans into a global plan. Combatant commanders establish theater guidance and objectives for AMD, then assign, and apportion forces and resources to accomplish the mission. The combatant commander's staff and component commander's staffs plan, monitor, advise, coordinate, and execute overall operations. Combatant commanders may delegate command authority to assigned or attached subordinate commanders.

JOINT FORCE COMMANDERS

3-31. A joint force commander (JFC) is a combatant commander, sub unified commander, or joint task force (JTF) commander authorized to exercise combatant command (command authority) or operational control over a joint force Figure 3-2. For example, in Operation Iraqi Freedom, General Tommy Franks, United States Central Command (USCENTCOM) commander, was also the JFC.

3-32. The JFC establishes campaign objectives, approves plans, and establishes AMD priorities, allocates forces, and apportions air power. Normally the JFC assigns overall responsibility for theater-wide and/or joint operations area-wide counterair operations to a JFACC, overall joint force defensive counterair (DCA) operations to an AADC, and airspace control to an ACA. The JFC commands forces through component and functional commanders.
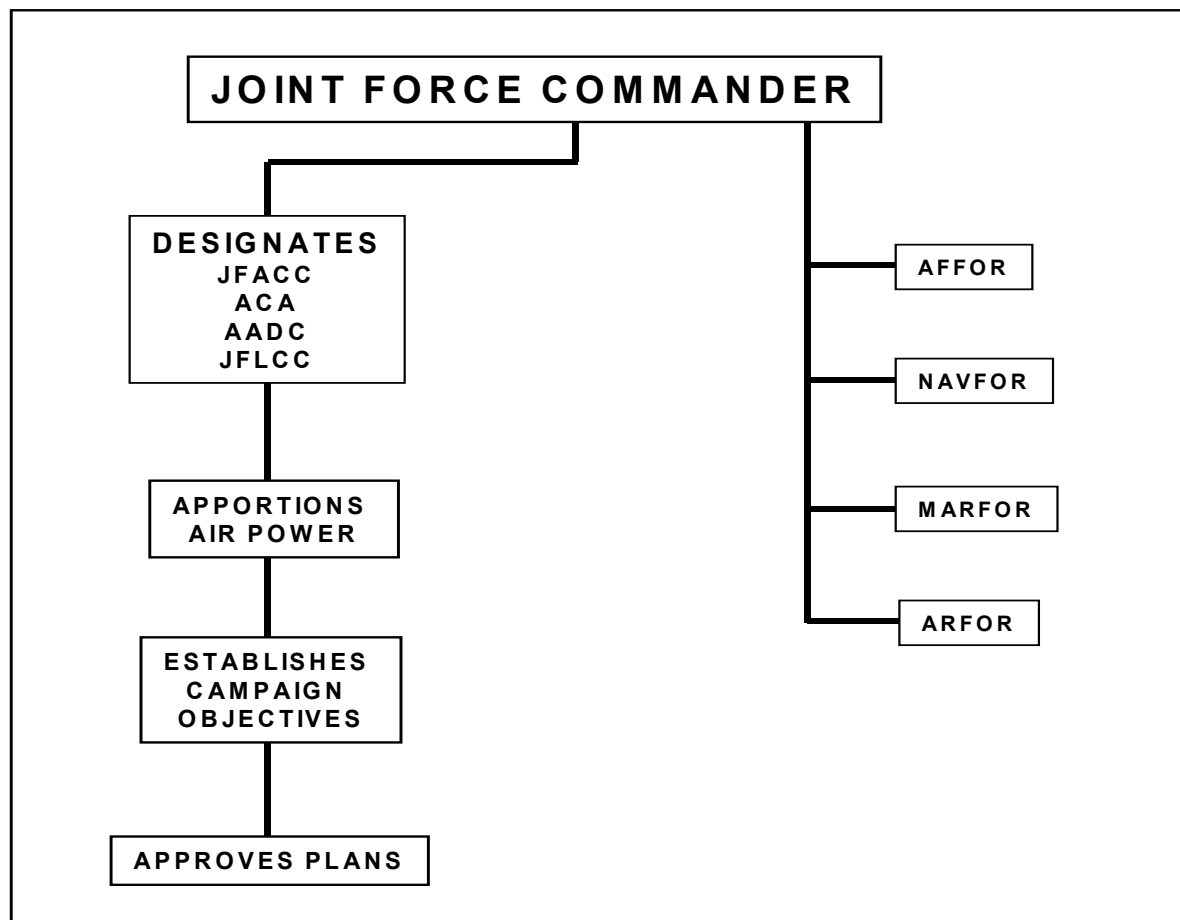
Figure 3-2. Joint force commander

COMPONENT COMMANDERS

3-33. Component commanders command one of the subordinate organizations that constitute a joint force. These commanders plan and execute all TAMD operations within their assigned AOs as directed by the AADC. Component commanders are responsible for planning and executing combat operations and for jointly coordinating and prioritizing their operations and needs with the JFC and with other component commanders. Component commanders are responsible for providing AMD warning to assigned forces. Component commanders will normally retain operational control of their active defense assets. The JFC may designate certain key forces or assets that the component commanders protect with their assigned active defense forces.

3-34. Close coordination among component commanders, the JFC, and the AADC is necessary to employ the most appropriate ADA resources. Appropriate ADA measures are required to execute effective JTAMD operations and to ensure a synergistic effort. Component-to-component coordination may be required in some situations as a result of the compressed timeline and short reaction times inherent in countering air and missile threats.

Joint Force Land Component Commanders

3-35. Joint force land component commanders (JFLCC) command all land forces within the theater of operations. The JFLCC is responsible to the JFC for making recommendations on the proper employment of land forces, planning and conducting land operations or accomplishing such operational missions as may be assigned. The JFLCC commands land forces, including Army and Marine ADA forces, and assigns missions.

Joint Force Air Component Commanders

3-36. Joint force air component commanders (JFACC) are designated by the JFC. The JFACC is a component commander, either United States Air Force (USAF) or United States Navy (USN). Their responsibilities include planning, coordination, allocation, and tasking of air assets based on the JFC's apportionment decision. The JFACC allocates air sorties to both offensive and defensive counterair, and JTAMD attack operations. The JFC usually assigns the JFACC responsibilities as both ACA and AADC.

Joint Force Maritime Component Commanders

3-37. Joint force maritime component commanders (JFMCC) are given the authority necessary to accomplish maritime missions and tasks assigned by the JFC. During the early part of force-projection operations, when the naval forces provide the preponderance of air assets, the JFMCC (or one of the subordinates) may be designated as the JFACC. If assigned as the JFACC, the JFMCC would also be assigned the responsibilities of the AADC and the ACA.

Joint Force Special Operations Component Commanders

3-38. Joint force special operations component commanders are responsible for planning and coordinating special operations or accomplishing such operational missions as may be assigned by the JFC. Special operations forces support OCA and JTAMD attack operations through reconnaissance and direct action operations.

Area Air Defense Commander

3-39. The JFC assigns responsibility for overall joint force defensive counterair operations to an AADC. The AADC is normally the component commander with the preponderance of ADA capabilities in theater and the command, control, and communications capabilities necessary to plan and execute integrated JTAMD operations. The AADC is usually a USAF/USN position. Normally, the AADC performs the following functions:

- Integrates defensive counterair forces and operations.
- Develops a database of friendly JTAMD active defense capabilities to facilitate JTAMD planning.
- Develops and executes plans for JTAMD active missile defense operations.
- Develops and promulgates JTAMD weapon control procedures and measures.
- Develops and executes plans for dissemination of missile warning information to components, allies, and host nation civil authorities.

Deputy Area Air Defense Commander

3-40. The JFC and AADC will determine whether a deputy area air defense commander for AMD (DAADC[AMD]) is designated. If so designated, the commander of the Army air and missile defense command assumes the role of the DAADC (AMD). This designation formalizes the relationship between the land-based ADA assets dedicated to theater level missions and the AADC and also ensures fully integrated and synchronized counterair and Army AMD operations.

3-41. The DAADC (AMD) serves as the AADC's principal advisor and coordinator for theater land-based air defense and TMD operations. The DAADC (AMD) provides the following support to the AADC:

- Integrates land-based active defense and ADA forces with the defensive counterair (DCA) plan.
- Advises the AADC regarding weapons control procedures and recommended or implemented airspace control measures, air defense warnings, weapon control status, and emissions control measures.
- Assists the AADC with AADP development.
- Advises the AADC on matters regarding land-based active defense operations and ensures effective integration of ARFOR assets into the AADP.
- Advises the AADC about ARFOR air defense weapons capabilities.

3-42. Although the AAMDC commander may serve as a "deputy" AADC, it is not envisioned that the DAADC (AMD) would assume the role of the AADC if the AADC were incapacitated. The DAADC (AMD) is not a true deputy commander in that sense. The DAADC (AMD) primary responsibilities are to assist the AADC in planning, coordinating, integrating, and synchronizing land-based ADA systems. Neither the AAMDC commander nor the staff has the tactical, technical, or procedural expertise and capability to perform all of the DCA functions of an AADC in a joint environment.

ARMY COMMANDERS

3-43. The levels of Army ADA command extend from AAMDC to brigade to battalion to battery to Fire Unit. These commanders work within the ADA structure as well as within Army corps and divisions. The commander has total responsibility for active air and missile defense planning within the Army component.

3-44. The ADA commander ensures that organic, assigned, and supporting ADA units accomplish offensive and defensive counter air objectives in support of the ground commander's concept of operations. The AAMDC commanders, ADA brigade commanders, and ADA battalion commanders develop air and missile defense plans for protection of their supported commander's AMD priorities. They also prepare the air defense annexes to division and corps operation plan (OPLAN) and the ARFOR commander or the JFLCC's operations plan.

AAMDC Commander

3-45. The commanding general (CG) of the AAMDC performs three critical roles. The CG commands the AAMDC and its subordinate echelons above corps (EAC) ADA brigades, performs the functions of the theater Army air and missile defense coordinator (TAAMDCOORD) for the ARFOR commander (or JFLCC if designated), and performs the functions of the DAADC (AMD) for the AADC. The AAMDC is the Army's operational lead for Army theater air and missile defense.

ADA Brigade Commanders

3-46. ADA brigade commanders are responsible for the planning and execution of AMD plans and missions. Commanders ensure that the ADA brigade is integrated and synchronized with adjacent, higher and lower AMD operations within assigned AO. Brigade commanders task organize active defense forces to protect priority assets on the defended asset list (DAL). ADA brigade commanders may also function as the DAADC (AMD)/TAAMDCOORD if the AAMDC is not deployed.

ADA Battalion Commanders

3-47. ADA Battalion commanders can command an ADA Battalion Patriot [ADA BN(P)] consisting of four Patriot firing batteries, one headquarters and headquarters battery (HHB) and one organic maintenance company or an ADA Battalion Patriot/Avenger [ADA BN(P/A)] consisting of four Patriot firing batteries, one Avenger firing battery, one headquarters and headquarters battery (HHB) and one organic maintenance company. One Patriot firing battery consists of six launching stations, one radar set, and one engagement control station (ECS). The ADA battalion (P/A) has six Sentinel radars, two Sentinels in HHB and four Sentinels in the Avenger battery and 24 Avenger fire units in the Avenger firing battery comprised of three platoons. Organic to the battalion is a maintenance company capable of field level maintenance. The ADA battalions provide air and missile protection for the force and selected geopolitical assets.

Theater Army Air And Missile Defense Coordinator

3-48. The theater army air and missile defense coordinator (TAAMDCOORD) is the commander of the highest echelon Army ADA command in the theater. When the AAMDC is in theater, the commander will be designated the TAAMDCOORD. The TAAMCOORD is the Army AMD coordinator for the ARFOR commander, and the combined/joint forces land component commander (C/JFLCC) (if designated). The TAAMDCOORD ensures that the Army is an integral part of joint counterair and active missile defense operations and planning at the theater level. The TAAMDCOORD, as a special staff officer to the ARFOR commander and JFLCC, participates in the operations directorate of a joint staff (J3)/plans directorate of a joint staff (J5) cells and assists in developing Army OCA and DCA input to the air operations plan. The

TAAMDCOORD ensures that corps AMD requirements are integrated into joint counterair and Army AMD planning.

ARMY AIR AND MISSILE DEFENSE COMMANDS

3-49. There are three Army air and missile defense commands: two active component and one reserve component. The AAMDC is the Army's operational lead for Army theater air and missile defense. The AAMDCs command Theater AMD brigades. AAMDCs provide a bridge between Army air defense and the joint world.

3-50. The AAMDC performs critical theater level air and missile defense planning, integration, coordination, and execution functions for the ARFOR commander and the JFLCC if designated; the AAMDC does not conduct engagement operations. The AAMDC integrates the following four operational elements of JTAMD to protect contingency, forward deployed, and reinforcing forces:

- Active missile defense.
- Attack operations.
- Passive missile defense.
- C2, communications system, and Intelligence.

3-51. The AAMDC headquarters consists of intelligence, fire support, aviation, chemical, air defense sections, and signal personnel. The AAMDC normally locates with the ARFOR/JFLCC headquarters or with the JAOC/combined air operations center (CAOC); however, the location of the commander and the role is dependent on METT-TC.

THEATER ADA BRIGADES

3-52. Theater ADA brigade missions include protection of theater level sustaining bases, military or political headquarters, and ports of debarkation. Theater brigades will deploy early into the theater to protect aerial ports of debarkation (APOD), seaports of debarkation (SPOD), early arriving forces and critical supplies. Entry forces move into tactical assembly areas for expansion operations. As the lodgment expands, ADA forces may move to protect critical assets, communications, transportation, and maneuver forces. After deployment operations, Theater ADA brigades and multinational forces will form a joint integrated defense.

ADA BATTALIONS

3-53. ADA battalions are located at Theater and corps. ADA battalions protect forces and selected geopolitical assets in the Theater and corps from air and missile attack. These battalions can be positioned to protect fixed assets or assigned to support maneuver forces. These battalions are versatile, mobile, and relatively easy to deploy. The ADA 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 ADA battalion consists of four Patriot firing batteries with six launching stations each and an organic maintenance company; or in a composite battalion include an Avenger battery with 6 Sentinel radar's, and 24 Avenger fire units controlled by the ADA battalion fire control center (FCC).

ADA BATTERIES

3-54. ADA batteries are tactical and administrative units corresponding to a company or similar unit in other branches of the Army. ADA fire units are deployed as a unit. Battery's with maneuver-based weapons have firing platoons. This could consist of one or multiple maneuver types of systems.

3-55. Fire units are the smallest size of a team, squad, or platoon that makes up a battery, or fire team.

ADA COMMAND CONTROL NODES

3-56. There are four variants of C2 nodes used in ADA units: command posts (CP), tactical operations centers (TOC), fire direction centers (FDC), and fire control centers (FCC). These nodes constitute the

physical and functional grouping of command personnel and of communications and computer systems that provide terminating, switching, and gateway access services to support information exchange. These C2 nodes are interdependent and do not necessarily exist as standalone entities.

COMMAND POST

3-57. The command post is the principal facility employed by ADA commanders to control operations. AAMDC, ADA brigade, battalion, battery, and platoon command posts (CP) consists of facilities for the commander, coordinating staff, and special staff. The organization of the CP reflects the commander's needs. CPs can be organized by echelon, for example, a tactical CP, main CP, and rear CP.

3-58. Command posts provide assured access to timely, accurate, and relevant information through interoperable digitized data links. Voice communications are also readily available. Command posts enable the commander to respond to changing circumstances regardless of the commander's location.

3-59. Command posts are organized to perform the following functions:
- Monitor the execution of operations.
- Synchronize combat activities to sustain tempo and adjust the plan to fit the situation.
- Maintain the current operations situation.
- Manage logistics.
- Provide a focal point for the receipt and development of intelligence.
- Plan future operations.
- Monitor operations of supported, adjacent, and higher echelon units.
- Provide situation information to higher headquarters.
- Monitor AMD engagement operations.

TACTICAL OPERATIONS CENTERS

3-60. A tactical operations center (TOC) consists of a physical grouping of elements concerned with current and future operations and tactical support. ADA TOCs are found at AAMDC, ADA brigades, and ADA battalions. The AMD planning and control system (AMDPCS) is the primary automated support system at ADA TOCs. The key component of the AMDPCS is the AMD workstation (AMDWS). There are multiple facilities (shelters and vans) at all echelons constituting a TOC.

FIRE DIRECTION CENTERS

3-61. A fire direction center (FDC) is that sub-element of brigade and battalion, batteries CPs, where engagement operations are conducted. The FDC receives digitized target information and fire control orders from the controlling authority. This information and orders are then propagated to appropriate fire units.

FIRE CONTROL CENTERS

3-62. The fire control center (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.

3-63. The FCC provides an effective and versatile combination of system capabilities with 360-degree coverage for a seamless air and missile defense while enhancing force protection capabilities. Voice and data communications (internal and external /Joint) are accomplished with tactical digital information link (TADIL)-J, TADIL-B, Patriot data information link (PADIL), enhanced position location reporting system (EPLRS), and single-channel ground and airborne radio system (SINCGARS). As a result of the increased number of radars and weapon systems, the need for an additional C2 center, the FCC is necessary to effectively manage the air battle and conduct friendly protect operations. The ADA battalion FCC is where integrated, net-centric engagement operations is conducted and engagement commands are directed to specific weapon platforms for rapid target prosecution and effective fratricide risk mitigation and prevention. Organic to the ADA 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.

COMMAND AND SUPPORT RELATIONSHIPS

3-64. The joint force commander (JFC) assigns responsibility for overall air defense operations to a single area air defense commander. With respect to the conduct of TAMD operations, the following principles normally apply–

- A JFC exercises operational control of all assigned forces to ensure unity of effort. Normally, this authority is exercised through component commanders. To achieve the objectives of the JFC, operations are conducted under the TAMD guidance.
- Command of ADA forces that may be committed to TAMD operations remain under the command of their respective component commander. ADA Forces are integrated into the air defense system according to the established joint operational procedures and the overall ADA priorities of the JFC.

3-65. All air defense forces operate under the rules of engagement and weapon control procedures approved by the JFC and promulgated by the AADC when conducting JTAMD operations. The JFC, JFLCC, ARFOR commander, and corps/division/brigade/battalion/ battery commanders establish command and support relationships for ADA units in accordance with joint and Army doctrine. ADA forces assigned to corps and lower maneuver elements are under the operational control of the echelon commander. At EAC, Army ADA forces are under the operational control of the ARFOR commander. The JFC determines the most appropriate command authority over forces made available, but normally surface-based active defense forces are provided in direct support to the AADC.

COMMAND RELATIONSHIPS

3-66. Command relationships are the interrelated responsibilities between commanders, as well as the operational authority exercised by commanders in the chain of command. Command responsibilities, responsibilities for service support, and authority to organize or reassign component elements of a supporting force remain with the higher headquarters or parent unit unless the authorizing commander specifies otherwise (Figure 3-3).

3-67. Direct liaison authorized (DIRLAUTH) is that authority granted by a commander (at any level) to a subordinate to directly consult or coordinate an action with a command or agency within or outside of the granting command.
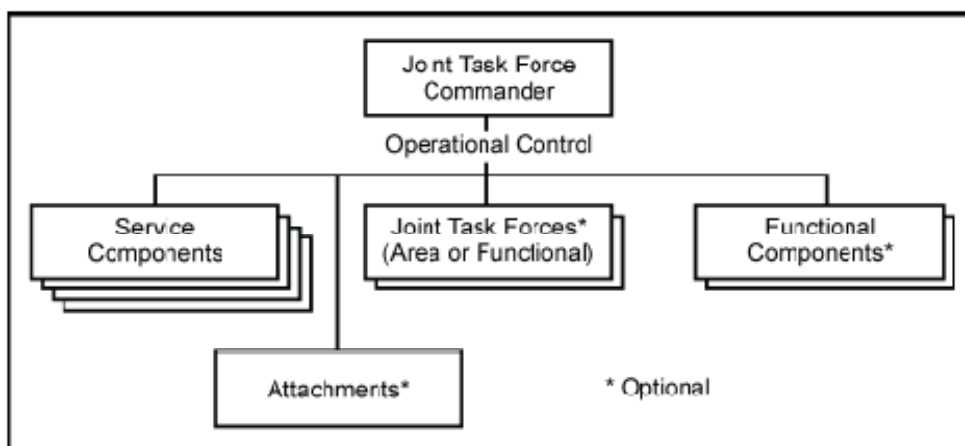
Figure 3-3. Command relationships

Combatant Command (Command Authority)

3-68. Combatant command (COCOM) (command authority) is a nontransferable command authority exercised only by commanders of unified or specified combatant commands. Combatant command cannot be delegated and is the authority of a combatant commander to perform those functions of command over assigned forces involving organizing and employing command and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations, joint training, and logistics necessary to accomplish the missions assigned to the command. Combatant command always includes operational control.

Attachment

3-69. Attachment is the temporary placement of a unit within another organization. Subject to the limitations imposed by the attachment order, the commander of the organization receiving the ADA element will exercise the same degree of Battle Command over attached units as over organic units. This includes administrative and logistical support. The parent ADA unit commander retains the responsibility for administrative functions.

Operational Control

3-70. Operational control (OPCON) is command authority that may be exercised by commanders at any echelon at or below the level of combatant command. OPCON may be delegated and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. OPCON includes authoritative direction over all aspects of military operations. OPCON does not include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training.

Tactical Control

3-71. Tactical control (TACON) is the command authority over assigned or attached forces, commands, military capability, or forces made available for tasking. TACON is limited to the detailed and local direction and control of movements or maneuvers. TACON is inherent in operational control. TACON may be delegated to, and exercised, at any level at or below the level of combatant command. TACON allows commanders below combatant command level to apply force and direct the tactical use of logistics assets. TACON does not provide authority to change organizational structure or direct administrative and logistical support.

SUPPORT RELATIONSHIPS

3-72. Support relationships define specific arrangements and responsibilities between supporting and supported units (Table 3-1).

General support

3-73. ADA units in general support (GS) roles provide support to the supported force as a whole and not to any particular subdivision thereof. ADA units in GS remain under the operational control of and are positioned by the ADA commander. GS is a support relationship commonly established to protect EAC, corps, or division level assets.

General Support-Reinforcing

3-74. ADA units with general support-reinforcing (GS-R) missions provide support for the force as a whole and secondarily augment the support provided by other ADA units. ADA units must coordinate with the augmented ADA units to reinforce the coverage of assets in the AO.

Reinforcing

3-75. ADA units in reinforcing roles augment the coverage of other ADA units and strengthen the air and missile defense capabilities of the force. Reinforcing ADA units are positioned to protect one or more of the reinforced units' priorities as specified by supported ADA unit commanders. For example, an echelon above corps ADA battalion could reinforce the maneuver ADA battalion.

Direct Support

3-76. ADA units in a direct support (DS) role provide dedicated support to a specific unit. DS ADA units provide dedicated air and missile defense for a specific element of the force, which has no organic air and missile defense. Supporting ADA units coordinate their movement and positioning with the supported unit. A maneuver ADA platoon, for example, may provide DS to a mechanized task force. The platoon will provide dedicated support to the task force and the platoon leader will position the platoon in conjunction with the task force commander's concept of the operation.

Table 3-1. ADA support relationships

*The term "positions" specifies the selection of the exact placement of individual fire units within the AO. The parent ADA commander retains responsibility for administration and logistics.

ISSUE	*DIRECT SUPPORT*	*GENERAL SUPPORT*	*REINFORCING*	*GENERAL SUPPORT REINFORCING*
Who establishes priorities?	The supported commander who established the support relationship.	The supported commander who established the support relationship	The supported commander	The ADA commander who established the support relationship
Who positions* ADA fire units	The ADA commander with the approval of the supported commander	The ADA commander in coordination with local ground commander.	The ADA commander with approval of reinforced ADA commander.	The ADA commander in coordination with reinforced ADA commander.
Who coordinates for terrain used by ADA fire units?	The supported commander	The ADA commander who established the support relationship.	The reinforced ADA commander	The ADA commander who established the support relationship.
With whom should liaison be established?	The supported unit	As required	As required and the reinforced ADA unit	As required and the reinforced ADA unit
With whom should communications be established?	The supported unit	As required	As required and the reinforced ADA unit	As required and the reinforced ADA unit

COORDINATION AND LIAISON

3-77. AMDCOORDS and liaison personnel accomplish coordination and liaison on matters pertaining to AMD. Liaison officers are drawn from air defense units at all echelons of command. They keep ADA commanders and staffs apprised of the status of AMD operations and recommend appropriate courses of action relative to air and missile defense. They also provide two-way information exchange with supported and supporting units. At EAC, they serve as subject matter experts on the capabilities of the AAMDC and its subordinate ADA forces. At a BCD, LNOs coordinate movement and support of ADA forces with maneuver forces. Automation and digitization utilized by LNOs are factors in Battle Command, but the coordination functions still require personal contact.

COORDINATION

3-78. Staff coordination is a function of the organization of the staff, command post configuration, doctrine, and local SOP. The AMDCOORD has a representative in the staff cells to plan and execute decisive, shaping ,and sustaining operations.

3-79. At the AAMDC/ADA brigade, coordination provides horizontal and vertical linkages to the various elements of the joint force. These staff elements include intelligence, fire support, electronic attack (EA), Air Force staff, Army aviation, Navy and or United States Marine Corps (USMC) air control systems, maneuver, and the Army airspace command and control (AC2) cell.

LIAISON

3-80. The AAMDC provides the staff and equipment to plan, coordinate, deconflict, and monitor the execution of theater air and missile defense during joint and multinational operations. The AAMDC has dedicated liaison teams that can deploy to major theater and ARFOR elements to integrate ARFOR air and missile defense operations. Elements to which the AAMDC deploys liaison teams include the following—

- Joint force commander (JFC).
- Joint force air component commander (JFACC).
- Area air defense commander.
- Joint force land component commander (JFLCC).
- Joint force maritime component commander (JFMCC).
- Joint special operations task force (JSOTF).
- Battlefield coordination detachment (BCD).
- Deep operations coordination cell (DOCC).
- Analysis and control element (ACE).
- Multinational headquarters.

3-81. The AAMDC normally deploys a liaison team to the AADC location to support the DAADC (AMD) and the AADC. The liaison team is normally led by an ADA colonel (O6) and will consist of sufficient personnel experienced in active defense, attack operations, and intelligence preparation of the battlefield (IPB) to support 24-hour AMD operations.

3-82. If the AAMDC is not in theater, the highest echelon ADA organization in the theater is responsible to provide liaison to the JFLCC, BCD, and AADC. It may also be necessary to send liaison teams to the air operations centers of other services or multinational forces. Liaison teams may also be required at other combat function locations for logistics or intelligence.

3-83. ADA brigade commanders at the corps level may provide liaison to the control and reporting center (CRC) and selected CPs of the corps and selected major subordinate commands. In some cases, it may be necessary to send liaison teams to divisions to augment the divisional AMDCOORD.

3-84. Maneuver ADA liaison officers are normally battery executive officers and platoon leaders. The LNO will usually work in a supported unit command post. The primary function of the LNO is to provide early warning and status of ADA systems. This contribution may be complementary to existing EW disseminating procedures, or it may be the only means that supported units receive an alert. The LNO will also become the maneuver unit's operations and staff and ensures that the ADA battalion commander and staff are informed of the maneuver unit's situation.

3-85. The AMDCOORD/LNO supports AC2 planning and identifies and coordinates air management issues (if any) not resolved between the aviation LNO, air liaison officer, and ADA officer. Maneuver ADA LNOs conduct coordination with the AC2 elements and participate in the airspace management process. The LNO verifies that ADA coordination is included in the AC2 plan. The LNO reviews the AC2 information that affects the maneuver ADA units.

AIR DEFENSE ARTILLERY FIRE CONTROL OFFICER

3-86. The ADAFCO is responsible to the senior director for coordinating air defense of designated facilities and areas, as well as coordinating and monitoring the command, air picture, and fire unit exchange between the CRC/AWACS/AEGIS/tactical air operations center (TAOC) and the Patriot Information Coordination Central or the ADA Battalion Fire Control Center (FCC).

3-87. An ADAFCO is required in any regional/sector air defense command in which an Army air/missile defense capability is employed. The ADAFCO has the expertise to advise the RADC/SADC on what course of action Army AD units would likely follow during non-standard situations, especially with degraded communications, what limitations ROE can have on autonomous Army ADA units, what tactics may be more effective, etc. ADAFCO elements should be part of/liaison to any of the Service air/missile defense operations centers that may have control of or support from Army ADA assets. Typically, an ADAFCO element deploys to the appropriate air defense region/sector location and is responsible to the RADC/SADC for integrating Army ADA capabilities into that part of the integrated air defense system. The ADAFCO must have access to dedicated AD communications links (for example, dedicated AD voice circuit) and with Army AD C2 nodes when conducting active air defense operations. Unless very unusual circumstances dictate, an ADAFCO should not be placed on an airborne warning and control/airborne command and control aircraft that is not a full-time SADC directing ground-based AD in conjunction with active air intercepts. Those aircraft normally lack a dedicated seat position and communications for the ADAFCO, and they do not have as reliable situational awareness available as does a RADC/SADC with a tactical data link and a common tactical picture or a COP.

AIRSPACE COMMAND AND CONTROL

3-88. Airspace control provides increased operational effectiveness by promoting the safe, efficient, and flexible use of airspace. Airspace control consists of the coordination, integration, and regulation of the use of airspace within a defined AO. Airspace command and control can be positive, procedural, or a mix. The JFC assigns overall responsibility and authority for airspace control to the joint force air component commander (JFACC). The JFACC, AADC, and ACA are usually the same individual. The mission of the ACA is to coordinate and integrate the use of airspace. The ACA establishes broad policies and procedures for airspace control operations and coordination among units in the joint operations area.

POSITIVE CONTROL

3-89. Army positive control is a technique of regulating forces that involves commanders and leaders actively assessing, deciding, and directing them. It may be restrictive in that commanders directly monitor operations and intervene to direct specific actions to better synchronize subordinates' operations. Excessive use of Army positive control can rapidly become detailed command (FM 3-0) Positive control for ADA relies upon near-real-time data from visual, radar, point of origin, sensors, computers, digital data links, electronic ID systems like IFF, and communications equipment to provide airspace and air defense control. Positive control is desirable but not always possible due to battlefield conditions and inherent system vulnerabilities. Facilities for positive control are subject to direct link attack, sabotage, or jamming. Line-of-sight requirements and limited communications can also restrict the availability of data from facilities that are operational.

3-90. Aerial combat identification (CID), the process of determining the friendly or hostile character of an unknown detected aerial object, ensures timely engagement of targets and prevents fratricide. Aerial CID is normally provided to Army ADA via the CRC or TAOC or ADA sensors with organic identification friend or foe (IFF). The tactical situation, electronic interference, or equipment malfunction may preclude positive friendly identification, but airspace control measures provide a procedural backup.

PROCEDURAL CONTROL

3-91. Army procedural control is a technique of regulating forces that relies on a combination of orders, regulations, policies, and doctrine (including tactics, techniques, and procedures). Army procedural control requires no intervention by the higher headquarters once it is established (FM 3-0). Procedural control for ADA relies upon techniques such as segmenting airspace by geography, altitude, time, and weapon control statuses. Procedural techniques are usually more restrictive than positive techniques but are less vulnerable to degradation from electronic or physical attack. Procedural control enhances the continuity of operations under the adverse conditions expected on the battlefield. Procedural control provides an immediate backup method should degradation of positive control occur. Procedural techniques provide a management means for air defense systems that do not have near-real-time data transmission capabilities. In conjunction with the ACA, the AADC implements procedural airspace controls that facilitate the integration and

synchronization of air defense assets into air operations to optimize airspace use, protect friendly units, and prevent fratricide. These airspace control measures are disseminated and updated via the airspace control order (ACO), which may be published in conjunction with the Air Tasking Order (ATO)/ Special Instructions (SPINS).

3-92. An ACM is employed to facilitate the efficient use of airspace to accomplish missions and provide safeguards for friendly forces. The theater airspace control plan and specific directives are used to implement airspace control measures. The AMDCOORD and AC2 elements at each echelon provide friendly ADA fire unit and radar locations to the BCD at the joint air operations center (JAOC). The tactical operational data message contains radar locations to prevent friendly fratricide of ADA radars. The intent is to eventually incorporate radar locations in the theater airspace control plan.

MIX OF POSITIVE AND PROCEDURAL CONTROL

3-93. Mixing positive and procedural techniques optimizes control of the airspace and air defense operations. For positive management, commanders consider the numbers and types of electronic means available. This will vary according to the depth of the battlefield. As operations move farther forward, available means for positive control decrease, necessitating additional procedural management.

3-94. Outside the forward area, air traffic generally moves in ways that are better suited for positive control. Positive control is easier to effect in this area and is usually the preferred method.

3-95. Forward of the corps, the generally high volume of aircraft and friendly missiles can make positive control extremely difficult. Flexible and varying missions can also necessitate more reliance on procedural control.

INTEGRATED AMD OPERATIONS

3-96. AMD operations are integrated through weapons control procedures, coordination with adjacent ADA units, coordination between service components, and through shared knowledge of the enemy and friendly situation. Integrated AMD operations require battle management, C2, computers, and intelligence provision and exchange of essential near real time information. This information includes air defense warnings that allow commanders to implement the appropriate active and passive air defense measures.

3-97. Air defense sensors are normally optimized to perform specific surveillance or control functions. To provide the spectrum of coverage required for air and missile defense operations, a number of complementary systems are necessary. These systems range from a mix of static and mobile equipment to strategic warning systems. Systems are netted to enable the gathering and dissemination of information to all ADA forces under all operational conditions.

BATTLE MANAGEMENT

3-98. Battle management is essential in an air environment that has large quantities of both threat and friendly airborne platforms. The related functions of airspace control and ADA Battle Command are coordinated through the principle of air battle management, which maximizes both offensive and defensive counterair (DCA) effectiveness.

3-99. Precise coordination is necessary to synchronize ADA forces. As a participant in air battle management, the operations staff officer (S-3)/assistant chief of staff, operations (G-3) at each level of command ensures close coordination among all airspace users. Management of the air battle employs a mix of positive and procedural control.

COMMAND AND CONTROL

3-100.   AD Battle Command systems provide automated support to passive and active missile defense and attack operations to provide timely assessment of the threat, rapid dissemination of tactical warning, targeting data, mission assignment, and post-strike assessments to the appropriate ADA element. AD Battle Command systems facilitate rapid data dissemination of information among intelligence assets, fusion and decision-making nodes, warning systems, and weapon systems. AD Battle Command capabilities support

the principles of centralized control, decentralized execution, and coordinated efforts by units assigned AMD tasks.

3-101.   AMD Battle Command functions are performed through an arrangement of personnel, equipment, facilities, databases, and procedures. AD Battle Command provides command authorities timely and accurate data and systems to plan, monitor, direct, control, and report AMD operations. For defense against BMs, short missile flight times require that all applicable air, land, sea, and space-based sensor and surveillance assets be linked to provide a complete and current air picture.

3-102.   AD Battle Command planning begins with the JFC estimate of the situation, objectives, and overall concept of operations. Subordinate commanders plan the tasking of their forces and resources based on the commander's guidance and priorities. To ensure complementary efforts and synergism all components of the force continually update their plans for passive missile defense, active missile defense, and attack operations.

3-103.   Planning operations consider both joint and multinational relationships when addressing the need for near real time response to the threat. The wide range of operations that may be appropriate, the diverse nature of the ADA elements that complement each other, and the possible impact of AMD on other missions and tasks are all considerations.

Active Defense

3-104.   Active air defense is a direct defensive action taken to destroy, nullify, or reduce the effectiveness of hostile air and missile threats against friendly forces and assets. It includes the use of aircraft, air defense weapons, electronic warfare, and other available weapons (JP 3-01).

3-105.   Active missile defense requires early detection of missiles in flight to permit cueing, acquisition, tracking, classification, identification, and destruction as soon as possible after launch. The AADC exercises control of active air defense operations by integration of ADA systems and forces into the Communications systems. Component commanders retain command of their active defense forces. They conduct operations within their areas of operations per AADC-developed, JFC-approved ROE, DAL, and airspace control measures to protect their forces and the JFC air and missile defense priorities.

Passive Defense

3-106.   Passive Air Defense is all measures, other than active air defense, taken to minimize the effectiveness of hostile air and missile threats against friendly forces and assets. These measures include camouflage, concealment, deception, dispersion, reconstitution, redundancy, detection and warning systems, and the use of protective construction (JP 3-01).

3-107.   Passive defense improves survivability by reducing the likelihood of being detected and targeted from the air and by mitigating the potential effects of air surveillance and attack. Passive missile defense measures include detecting air and missile launches, predicting impact points, and providing threat identification (chemical, biological, radiological, nuclear, and high-yield explosive (CBRNE) or conventional) and disseminating early warning. It includes measures initiated to reduce vulnerability and to minimize the effect of damage caused by missile attack. Passive defense measures by all elements of the joint force are essential to force protection.

Attack Operations

3-108.   Attack operations require timely transmission of targeting data and accurate identification of threat operating location and support systems. Designation of engagement areas, assignment of areas of operations (AO) and coordination of AMD attack operations are prescribed by the JFC. The JFC will normally task component commanders for conduct of attack operations against threats within their assigned AOs. Subordinate commanders control attack resources and coordinate and conduct their operations according to joint doctrine and procedures. The JFACC normally supports planning and conducting attack operations against theater missiles that are outside the other component commanders' AOs. Coordination of attack operations involves the detection, acquisition, classification, and identification of enemy TMs and the dissemination of the targeting information to the designated attack system for execution.

TACTICAL-LEVEL AMD CONSIDERATIONS

3-109.   Tactical-level air and missile defense requires the integration of ADA units with other combined arms elements. Tactical-level air and missile defense is primarily the responsibility of ADA, but maneuver, fire support, aviation, and intelligence elements participate directly. Each participant has a specific role in tactical air and missile defense plans and operations. These integrated roles are mutually supporting.

MANEUVER

3-110.   Maneuver forces with an air defense capability increase the density and effectiveness of AD across the battlefield. However, the optimum role for these forces is ground combat. The maneuver commander carefully considers the benefits of combined arms air defense contributions versus the decrease in ground combat effectiveness. Combined arms elements can provide vital self-protection from air threats and contribute to their freedom to maneuver.

3-111.   Maneuver elements' capabilities to engage fixed-wing aircraft, cruise missiles, and UAS are limited or nonexistent, but combined arms members can effectively engage hovering or slow-moving helicopters within their weapon systems' ranges. The AMDCOORD recommends to the maneuver commanders those areas where the use of other combat arms weapons in an air defense role can supplement the ADA units' capabilities.

FIRE SUPPORT

3-112.   Fire support capabilities can also augment tactical-level AMD. Indirect fire weapons can deny enemy helicopters the use of masked, standoff positions. Fire support systems can concentrate their fires on enemy launch systems and sites, landed fixed and rotary wing aircraft, command and control (C2) nodes, landing zones, pickup zones, assembly areas, and forward arming and refueling points (FARP).

AVIATION

3-113.   Army aviation contributes to AMD activities through air to ground combat operations. Aviation can conduct air to ground attacks against targets that cannot be effectively engaged by indirect fire systems. Army aviation also participates in air assault operations against aerial and missile launch platforms.

3-114.   Other attack operations conducted by Army aviation occur in response to specific air threats and their launch platforms. Attack reconnaissance battalions and attack helicopter battalions can fill gaps in the force's air defense when ADA units are redistributing assets and adjusting forces. Early warning provided by screening or attack aviation assets is integrated into AMD early warning and vice versa.

3-115.   Coordination between the aviation and ADA commanders is particularly important, as aviation forces operate within the same airspace as ADA systems. Prevention of fratricide is a major element of force protection. Identification of on-order air defense missions for aviation occurs during the formulation of the commander's plan. The plan includes command relationships and detailed control measures for the employment of aviation in an air defense role.

INTELLIGENCE ELECTRONIC WARFARE

3-116.   Intelligence and electronic warfare (IEW) assets contribute to AMD operations. As part of information superiority commanders may coordinate the use of IEW systems, including joint assets, against OCA. AMD targets are similar to coordination for fire support and involve the G-3, assistant chief of staff, intelligence (G-2), fire support coordinator (FSCOORD), and AMDCOORD. Intelligence and electronic warfare (IEW) information superiority supports air defense operations through electronic attack and electronic warfare support on air targets. Careful planning and execution of electronic warfare complements surface-to-air fires. IEW can also provide for surveillance, identification, and classification of hostile air targets aiding AMD greatly through early warning.

3-117.   The AMDCOORD coordinates with the G-2 or intelligence staff officer (S-2) to ensure air and missile defense intelligence information requirements are met during the planning phase. The focus of tactical intelligence could include forward operating bases, FARP, missile and UAS capabilities, electronic

warfare systems, logistics facilities, and command and control nodes. The interface between the AMDCOORD and G-2 or S-2 is essential to gain a coordinated and accurate evaluation of enemy air and missile capabilities.

AIR AND MISSILE DEFENSE PLANNING

PLANNING

3-118.   Planning for attack operations begins with the IPB process. The IPB process includes surveillance of likely TM launch areas and prediction of likely enemy TM activities. AMD planners must coordinate with the S-2 for IPB development. Upon completing the initial analysis, the JFC issues guidance on the concept and priorities for TM attack operations. Based upon the JFC staff and component commander recommendations, the JFC assigns missions to the component commanders and provides guidance for AMD attack operations. Component commanders then plan attack operations based on the assignment of attack responsibilities, the JFC's concept, priorities, and allocation of attack operations resources.

3-119.   TAMD attack operations require the integration and coordination of all joint force plans. The JFC may task an organization within the joint staff to integrate component commanders' plans or may delegate this responsibility to a subordinate commander. If established, the joint targeting coordination board may be an integration center for this effort or serve as a JFC-level review mechanism. Because of the mobility of TM systems, the time to acquire, target, and attack TM elements may be very short. Thus, an accelerated execution cycle using the decide-detect-deliver-assess process is required. Based upon pre-established JFC approved priorities and ROE, enemy TM targets are attacked by the most appropriate attack system as soon as detected.

3-120.   Operational-level counterair and AMD planning requires careful selection and prioritization of AMD attack operations targets. Effective planning enables each level to "decide-detect-deliver-assess" and accelerates the engagement of targets during combat. AMD attack operations plans consider the use of all available assets including aircraft, surface-to-surface missiles, artillery, UAS, SOF, and EA.

3-121.   The Fires Cell (FC) is an Army organization frequently used at division, corps, and theater levels that serves as the center for focusing and integrating the planning, coordination, synchronization, and execution functions for deep operations. The FC works with the BCD and other coordination elements. The FC plans and coordinates, as appropriate, the use of fires, combined arms maneuver, SOF, and AC2 in support of Army deep strike operations.

3-122.   The AAMDC has the necessary intelligence tools to provide focus to AMD attack operations for the commander ARFOR (COMARFOR), JFLCC, and the JFACC. The AAMDC recommends attack operations targets to the FC for prosecution. The AAMDC provides liaison teams to the FC, analysis and control element (ACE), joint and special operations task force (JSOTF), BCD, and JAOC/AOC to coordinate and assist AMD attack operations within the ARFOR and the joint force attack operations structure. The AAMDC does not usurp the traditional mission of the FC, BCD, or AOC in coordinating attack operations.

3-123.   TAMD attack operations targets are generally located deep within enemy territory and well behind lines of contact. These targets include the following:
- **Air and Missile Systems.** These systems include rotary-wing and fixed-wing aircraft, BMs, CMs, UAS controllers, and launcher vehicles that are on the ground. Acquisition radars, tracking radars, and other air operation support systems are also targets.
- **Enemy Support Facilities.** Facilities include airfields, launch sites; logistics support facilities, technical support facilities, and weather/navigational aids.
- **Command and Control Facilities.** These facilities are used to maintain centralized control of air and missile assets. Targeting these facilities supports information warfare by interfering with the enemy's decision-making cycle and disrupting their ability to synchronize operations.
- **Electronic Attack (EA) Systems.** EA targets include land-based jamming systems and their control elements. Attacking these systems supports information warfare operations.

- **Air Defense Systems.** These systems include surface-to-air missile (SAM) sites and radars. Suppression of enemy air defense (SEAD) is an integral part of all friendly air operations.

3-124.   Joint operations planning is performed according to policies and procedures established in the joint operations plan. Joint AMD operations planning activities are conducted at the national, theater, and supporting command levels. (Additional information on AMD planning is found in this manual, Appendix C.)

OFFENSIVE COUNTER AIR

3-125.   Offensive counterair operations are conducted at the initiative of friendly forces. OCA seeks to dominate the adversary's airspace and prevent the launch of air and missile threats. OCA consists of offensive measures to destroy, disrupt or neutralize adversary aircraft, missiles, launch platforms and their supporting structures and systems. Ideally, joint OCA missions will prevent the launch of aircraft and missiles by destroying or neutralizing them prior to launch. Those weapons that are launched will be destroyed or neutralized as close to their source as possible. OCA and defensive counterair operations need to be synchronized and integrated to achieve unity of effort for theater- and/or joint operations area-wide counterair.

DEFENSIVE COUNTER AIR

3-126.   The goal of DCA operations is to provide a secure area from which joint forces can operate. Defensive counterair is inherently joint. Joint theater missile defense operations are an integral part of CA and operations against tactical aircraft and missile threats are thoroughly integrated with AMD operations. Joint forces are integrated toward the common objective of neutralizing or destroying the adversary's offensive air and missile capability. A distributed, collaborative Battle Command environment will ensure that the integrated air and missile defense system is integrated into the joint force commander's (JFC's) overall concept of operations and campaign objectives. Efficient battle management, communications and ISR processes and systems ensure unity of effort and a synchronized joint force capability.

3-127.   In addition to passive and active defense, the joint theater missile defense incorporates planning and Battle Command actions to facilitate OCA attack operations. Preemptive destruction of aircraft and missiles is more efficient and effective than engaging them in flight.

PLANNING PROCESSES FOR AAMDC, ADA BRIGADE, AND BATTALION

3-128.   AMD planning involves joint, multinational, and Army units including joint forces, service or functional component commands, AAMDC, ADA brigades and battalions. At each level of command, planning begins with the receipt of a mission from higher headquarters and culminates in the issuance of an operations plan, which provides planning direction to subordinate commands. The designation "plan" is usually used instead of "order" in preparing for operations well in advance. An operation plan may be put into effect at a prescribed time, or on signal, it then becomes the operation order.

3-129.   AMD planning is performed concurrently at all echelons, a process known as "parallel planning." The planning process is performed at each echelon as well as the planning products exchanged between echelons. This planning is summarized in the paragraphs below.

AAMDC PLANNING

3-130.   The AAMDC has overall responsibility for planning Army AMD operations in support of the Joint Force Commander. As the AAMDC planners review the assigned mission, critical assets to be protected, the enemy situation, and the composition and disposition of ADA resources available to protect critical assets against the known threat. This is based on the IPB process. Then a top-level defense lay down is conducted to estimate if available ADA resources can adequately protect critical assets. If levels of protection cannot be achieved, additional resources are requested from the service or functional component commander (or the commander is advised of the risk to forces or assets).

3-131. The AAMDC task organizes the subordinate ADA brigade(s) and assigns missions to the brigade(s). If the AAMDC is not present in theater, the responsibility for this planning falls to an EAC ADA brigade. To ensure the overall Army ADA effort within the theater is coordinated and synchronized, the AAMDC coordinates planning with the corps and corps ADA brigades.

ADA BRIGADE PLANNING

3-132. The ADA brigade commander and staff review the operation order (OPORD) received from higher headquarters, including the mission, situation, concept of operation, tasks, air defense priorities and other information. The ADA brigade commander and staff then produce an operations plan that describes how tactical operations in the brigade AO will be carried out. This plan includes the restated mission, tasks to be performed, resources to be allocated, assets to be protected, number of fire units needed to protect assets, and coordination and control measures to be followed.

3-133. The number of fire units needed to defend an asset can be determined by referencing the DAL and the levels of engagement effectiveness prescribed by the JFC. Critical assets are posted to a database/overlay and provided to subordinate battalions along with the OPORD.

ADA BATTALION PLANNING

3-134. The focus of ADA battalion planning is to produce a detailed defense design that protects forces and critical assets with required levels of protection. The battalion planning process conducted on the tactical control station (TCS) is part of military decision-making process (MDMP). The defense design is accomplished using automated planning capabilities resident in the TCS. The TCS provides the battalion commander and staff with organized workspace to support defense planning with automated decision aids, real-time situation awareness, and initialization of the battalions' weapon systems.

3-135. EAC and maneuver ADA battalion planners require specific information inputs to accomplish the planning function(s). These inputs are listed on the left side of Figure 3-4. As each step is completed, specific planning products are produced. These products, or outputs, are listed on the right side of Figure 3-4. The steps are performed in sequence to produce an accomplished mission with a defense design plan that adequately protects forces and assets.
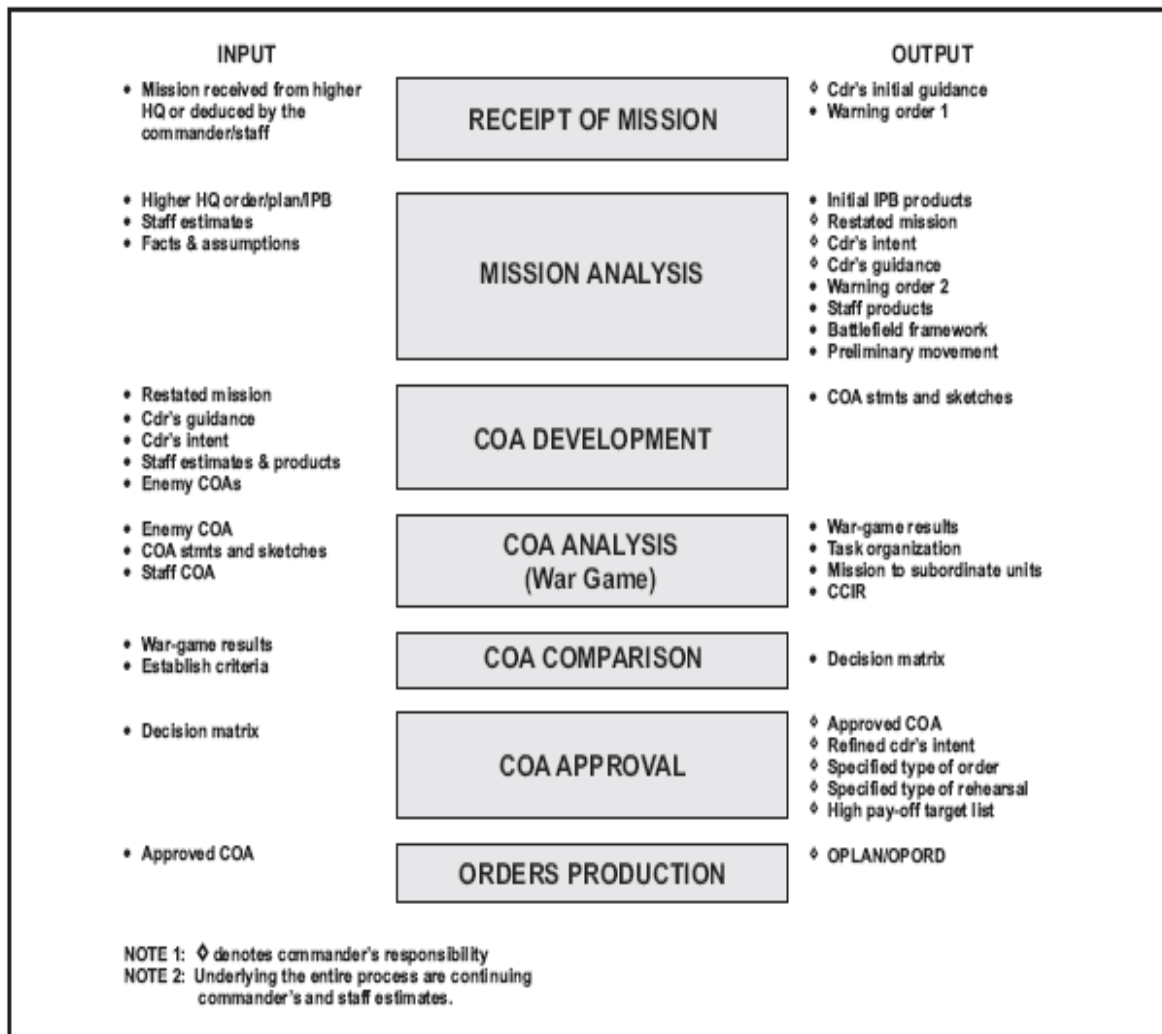
INPUT

- Mission received from higher HQ or deduced by the commander/staff

RECEIPT OF MISSION

OUTPUT

- ◊ Cdr's initial guidance
- Warning order 1

- Higher HQ order/plan/IPB
- Staff estimates
- Facts & assumptions

MISSION ANALYSIS

- Initial IPB products
- ◊ Restated mission
- ◊ Cdr's intent
- ◊ Cdr's guidance
- Warning order 2
- Staff products
- Battlefield framework
- Preliminary movement

- Restated mission
- Cdr's guidance
- Cdr's intent
- Staff estimates & products
- Enemy COAs

COA DEVELOPMENT

- COA stmts and sketches

- Enemy COA
- COA stmts and sketches
- Staff COA

**COA ANALYSIS
(War Game)**

- War-game results
- Task organization
- Mission to subordinate units
- CCIR

- War-game results
- Establish criteria

COA COMPARISON

- Decision matrix

- Decision matrix

COA APPROVAL

- ◊ Approved COA
- ◊ Refined cdr's intent
- ◊ Specified type of order
- ◊ Specified type of rehearsal
- ◊ High pay-off target list

- Approved COA

ORDERS PRODUCTION

- ◊ OPLAN/OPORD

NOTE 1: ◊ denotes commander's responsibility
NOTE 2: Underlying the entire process are continuing commander's and staff estimates.

Figure 3-4. MDMP process

3-136. Planning begins with the receipt of a new mission from the ADA brigade S3 or the division depending on the type of battalion. The corps ADA elements and the assistant division air defense officer both notify their battalions of new missions. Parallel planning begins at this time. They begin their estimates and annexes to the corps and division OPORDs.

3-137. The ADA battalion commander depends heavily on the corps or division representative for accurate and timely information during the initial stages of planning. If the situation permits, the maneuver ADA battalion commander may need to move to the supported unit's planning cell to best influence the planning cycle during the deliberate decision making process.

MULTINATIONAL AMD OPERATIONS CONSIDERATIONS

3-138. Army AMD operations are also conducted within the context of an alliance, coalition, or other international arrangement. Within this context, the JFC is subordinate to the multi-national force commander. In either event, the JFC considers those areas peculiar to multinational operations that may influence the ability to achieve multinational unity of effort.

3-139.   Leaders of the alliance or coalition approve command relationships among the elements of the alliance or coalition. Special AMD considerations and areas of emphasis are needed to ensure unity of effort with non-U.S. forces. There are varying national interests that require AMD protection. Differences in doctrine, training, equipment, and organization are identified and considered when determining alliance interoperability requirements. The multinational combatant commander is responsible to both national and allied or coalition leaders.

SUPPORT CONSIDERATIONS

3-140.   When national forces of the multinational force are not capable of defending against enemy air or missile capabilities, provisions are made to ensure that ADA assets are provided within JFC-established priorities. This may entail introducing ADA assets from another theater. For this reason, ADA units and support organizations train, orient, and exercise to operate in the total spectrum of potential operational environments. As in joint operations, multinational combatant commanders may choose to organize on an area or functional basis, or a combination of the two.

OPERATIONS AND TRAINING

3-141.   Multinational consensus on the threat, a clearly defined chain of command, and a responsive, interoperable Battle Command structure are crucial to successful multinational AMD operations. National forces, civilian populations, and selected geopolitical assets are protected from the effects of the threat. A multinational commander may also consider assisting host nation or civil authorities in establishing passive defense measures for the civilian population and host nation assets consistent with the overall mission.

3-142.   Threats to the total multinational force, to include rear areas, are considered. Consensus on the threat facilitates the integration of national and alliance or coalition intelligence collection efforts, allocation of collection resources, and threat evaluation.

3-143.   National forces are assigned AMD missions that produce, in concert with other forces, more significant effects than if employed alone. Tasks to national forces are assigned commensurate with their capabilities.

3-144.   Multinational commanders plan and disseminate warning and attack predictions to civil authorities. They establish simple, effective warning dissemination systems.

3-145.   Multinational exercises with full participation of communications systems and intelligence assets are vital to establishing and refining sound procedures. Exercises provide an environment for the simultaneous practice of multi-echelon procedures. Exercises are helpful in adapting a unit to a new environment subsequent to deployment from one geographic area to another. Exercises may also provide a deterrent effect.

Chapter 4

Offensive and Defensive Operations

This chapter describes Army air defense participation in offensive and defensive operations. Offensive operations aim is to defeat the enemy decisively by using overwhelming, aggressive force. Defensive operations defeat an enemy attack, buy back time, economize forces, and/or develop conditions favorable for offensive operations. Air defense elements protect friendly forces and geopolitical assets and accomplish other missions assigned by the JFC. At the Strategic level of war ADA forces protect high visibility JIIM and national assets, as a layer within the ballistic missile defense system (BMDS) and supports homeland defense operations. At the Operational level of war, ADA forces protect the theater assets based on the JFCs critical asset list (CAL) like, seaports of embarkation, air ports of embarkation, cities, logistic centers, religious centers, and lines of communications (LOC). At the tactical level of war, Army ADA forces support the Land Component Commanders (LCC)/ARFOR scheme of maneuver while protecting theater, Corps, division, and Brigade Combat Teams (BCTs) forces according to the JFCs defended asset list (DAL) priorities.

AIR AND MISSILE DEFENSE IN THE OFFENSE

4-1.   AMD is a key enabler to the force during offensive combat operations. AMD tasks in support of offensive operations includes the following:

- Providing air and missile defense to maneuver forces.
- Protecting Forward Arming and Refueling Points (FARP), bridgeheads, supply trains, lines of communications (LOC), and C2 nodes from aerial attack.
- Developing targeting information in support of attack and passive defense operations.
- Determining and reporting BM launch points and impact point predictions.
- Gaining and maintaining information superiority.
- Supporting the JFACCs theater counterair effort.
- Provides force protection during attack operations.

ADA BATTALION IN THE OFFENSE

4-2.   The ADA Battalion plan includes contingencies for continuing the attack, suppressing possible enemy counterattacks, and protection of forces and critical assets from air attack. Commanders plan defenses using ADA guidelines that include defense-in-depth as an essential element. Defense-in-depth is the placement of mutually supporting defense positions designed to absorb and progressively weaken enemy attack, prevent enemy observations of the friendly positions and permits the ARFOR commander to maneuver reserve forces. From an AMD perspective, defense-in-depth involves employing ADA forces in a manner that provides multiple engagement opportunities along the entire flight path or trajectory of a hostile aircraft or missile.

4-3.   ADA(A) battalions and batteries are the LCC primary tools in the counter-ISR fight. The LCC will frequently use them to support the covering force. The tactical situation, LCC concept of operations, defense priorities, and the units' capabilities will determine SHORAD employment.

4-4.   ADA units, with SHORAD capabilities, assigned for protection of friendly forces during offensive operations will move so they are in positions to best protect the force. Consideration is given to weighting

the main effort with additional SHORAD assets oriented on likely avenues of approach. The ADA commander's plan supports the maneuver commander's scheme. If necessary, ADA(A) battalion commanders can request assistance from ADA(P) battalion commanders to reinforce the air defense coverage. This allows for massing of forces at the critical time and place to promote effective engagements.

COMBINED ARMS FOR AIR DEFENSE

4-5.   During offensive operations, enemy forces may attempt to use maneuver and fire support assets to regain the initiative. Enemy air activity includes ISR operations in support of artillery and maneuver. UAS are best suited for these types of operations, especially if enemy forces have developed effective C2 and ISR. The enemy may use helicopters as a secondary weapon system, or dedicated attack assets, or armed utility helicopters. Helicopter assets can be used in attack, air insertion, or reconnaissance. Helicopters in the reconnaissance role will operate in the same manner as UAS to support friendly artillery targeting and maneuver. In the attack, friendly forces can expect spoiling attacks that usually consist of at least two helicopters or more (taking full advantage of cover and concealment) with the mission of disrupting friendly operations.

4-6.   The enemy can use helicopters in conjunction with armored forces to attempt to deter friendly penetrations by the U.S. forces. The enemy will use ground forces first to neutralize friendly air defense assets whenever possible. Helicopters can be used as a primary aerial platform against U.S. maneuver forces.

4–7.   Enemy aircraft may be limited in the face of friendly air superiority. However, the use of enemy aircraft cannot be entirely ruled out. If used by the enemy, the ground commander can expect to see aircraft in support of a coordinated enemy ground operation.

4–8.   Non-ADA combatants are capable of firing in self-defense at enemy attack or surveillance aircraft. Small arms and crew-served weapons should fire against rotary and fixed-wing aircraft, UAS, and CMs thus providing a significant terminal defense. Individual and crew-served weapons can mass fires against enemy air threats. The massed use of guns in local air defense causes enemy aircraft to increase standoff ranges for surveillance and weapons delivery and increase altitude in transiting to and from friendly targets. These actions make enemy aircraft more vulnerable to air defense systems. Combined arms for air defense training and tactical SOPs enable friendly forces to effectively prepare for self-defense against air attack.

THEATER AIR AND MISSILE DEFENSE ATTACK OPERATIONS

4-9.   Theater Air and Missile Defense (TAMD) attack operations are operations taken to destroy, disrupt, or neutralize TM launch, aerial platforms, air threats, and supporting structures and systems. The objective of attack operations is to prevent the launch of TMs by attacking each element of the overall system, including such actions as destroying launch platforms, C2 nodes, missile stocks and infrastructure. The preferred method of countering enemy TM and air operations is to attack and destroy or disrupt BMs prior to launch or flight.

4-10. Attack operations can be preemptive or reactive. Sustained effort is required to reduce the enemy's TM and air capability and involves the execution of mutually supporting tasks. The detection, acquisition, classification, identification, tracking, and attack tasks are highly dependent on a near real time communications system, C2, and ISR process and rapid targeting capability. Attack operations use all-source intelligence, missile-warning systems, and air defense radars to locate and target enemy TM, and air systems, components, and supporting systems.

4-11. Attack operations are also dependent upon predictive and developed useful intelligence. Because it is difficult to detect mobile launch systems, a communications system, C2, and ISR capability must exist to support near real time targeting and attack operations. National sensor systems will normally augment theater air- and ground-based systems to provide warning, impact prediction, and launch point determination. Additionally, intelligence products collected by national sensor systems can assist theater forces to anticipate TM operations and to determine enemy TM unit locations. SOF involvement may be through attack of TM targets by direct action operations or through conduct of special reconnaissance.

ARMY ADA IN ATTACK OPERATIONS

4-12. The primary role of Army ADA in attack operations is identifying, planning, and coordinating enemy targets. Army ADA systems provide estimated TBM launch points, which are used to locate potential targets.

4-13. Execution, however, is outside the domain of Army air defense. Execution of air and ground AMD attack operations is centrally planned, executed in a decentralized manner, and governed by applicable policies, doctrine, tactics, techniques, and procedures. Execution of TAMD attack operations relies on sensor systems, responsive near real time sensor management and communications networks, and long-range attack weapon systems. Weapon systems used for attack operations include JIIM, Naval, Air, and Land forces including fixed-wing and rotary wing aircraft, CMs, and fire support systems. Special operations forces (SOF) are also used to carry out attack operations. At execution levels, well-defined intelligence and operations interfaces provide rapid targeting and engagement of mobile TM launchers and support assets.

SYSTEMS AND FORCES AVAILABLE

4-14. The manner in which the offensive battle is prosecuted depends on the forces and systems available and their general capabilities. Various forces and systems are discussed in the following paragraphs.

Aircraft

4-15. Aircraft conduct close and deep attack-strike operations against targets on the ground, in the air or on/in the sea. They also conduct fighter sweeps and air escort missions to destroy enemy aircraft in flight. Aircraft equipped for antisubmarine operations, electronic warfare, aerial refueling, and surveillance, warning, and control activities also support offensive operations.

Surface Firepower

4-16. Cannon, Rockets, Artillery, Mortars, land, air, and naval gunfire may be employed against enemy targets. Land-attack cruise missiles (LACM) may be effective against stationary soft targets such as unsheltered aircraft or command and control facilities. Surface-to-surface guided missiles, such as the Army tactical missile system, CMs, and unguided rockets such as multiple launch rocket systems, may also be used.

Unmanned Aircraft Systems

4-17. Unmanned aircraft systems may be used for attack, surveillance, deception, jamming, decoy, or harassment operations. They can be used against targets or in support of other forces conducting offensive operations.

Special Operations Forces

4-18. Special operations forces (SOF) normally conduct direct action strikes and collect intelligence. They can also provide terminal guidance (laser designation) for air attacks against transporter-erector-launchers (TEL), airfields, operating bases, and other facilities that support enemy air operations.

Maneuver Forces

4-19. Though the majority of offensive operations require the use of air and fire support assets, maneuver forces can also contribute. Mechanized or armored units, airborne and air-assault infantry, U.S. Marine amphibious forces, and attack aviation assets can all be used to attack airfields, forward operating bases, and other targets.

4-20. Defense applies to offensive operations and is initiated to protect maneuver forces against air and missile attack by destroying airborne launch platforms, and missile threats in flight. Defense during offensive operations includes a multilayered defense-in-depth via multiple engagements using air, land, and sea assets. It also includes electronic warfare to disrupt remote or onboard guidance systems.

DEFENSIVE OPERATIONS

4-21. Air and missile defense operations provide a secure area from which all elements of the joint force can operate. To accomplish this, defensive counterair operations protect friendly land and naval forces, bases, lines of communications, and other assets while denying the enemy the freedom to carry out offensive air operations.

4-22. Route and point security missions require SHORAD capable units to locate along the main supply route (MSR) and in positions to protect fixed locations. The AD commander allocates defense assets to protect these locations in accordance with the factors of METT-TC.

4-23. ADA units in forward areas engage enemy aircraft providing CAS or attempting low-level penetration of friendly air defenses en-route to a target in the rear area. Air Defense assets protecting combat forces in forward battle positions and strong points are more exposed to destruction by enemy direct and indirect systems than air defense systems located at rear areas.

4-24. In defensive operations, commanders position air defense forces to protect critical assets that include reserve or striking forces, whether stationary or moving. Stinger-based systems protecting the reserve and the striking force are as mobile and survivable as the forces they are protecting. The commander continually coordinates defense activities with air and artillery operations to avoid fratricide. Air defense units and support assets may move in support of the defensive effort. If the enemy can disrupt this support from the air, it will affect the defense. Correct assessment of enemy air corridors and tactics is essential to guarantee protection and management of these resources.

4-25. The destruction of key bridges, or the closing of choke points, interrupts the LCCs freedom of movement. The force must protect these positions to sustain the defense and allow the conduct of counterattacks. The commander coordinates air defense artillery forces to protect vital locations.

ACTIVE DEFENSE OPERATIONS

4-26. Active air defense operations are supported by dedicated, secure, and highly responsive communications in order to detect, classify, identify, track, engage, intercept, and destroy hostile or potentially hostile airborne targets. Integrated employment of air-to-air and surface-to-air systems through coordinated detection, classification, identification, assessment, and engagement is necessary. Airspace control in an active air defense environment is crucial to successful friendly air operations and effective air and missile defense.

4-27. The commander's priorities for air defense protection in the defense begin with command and control facilities. Command and control facilities include command posts and tactical operations centers. They are susceptible to targeting and attack because of their visual and electronic signatures. Air defense coordinators examine air avenues of approach toward command and control facilities and position AD weapons to prevent enemy aircraft from reaching their targets.

4-28. Positive control and procedural measures will be implemented to ensure that friendly aircraft can safely transit the airspace without inhibiting air and missile defense or other friendly operations. Regardless of other controls and measures imposed within defended airspace, all air defense artillery forces must readily identify all aircraft in the area by electronic, visual, or procedural means.

EXECUTION OF ACTIVE DEFENSE OPERATIONS

4-29. Execution of active air defense operations requires surveillance and reporting systems capable of near real time production and dissemination of tracking data. Detected tracks are classified and/or identified. Classification is an automated process that puts targets in specific categories (for example, cruise missile versus manned aircraft). Identification is a process that assigns the target a friend or foe status. Classification and identification information along with target location is transmitted via broadcast networks. Detailed and timely track data allows C2 nodes to evaluate the track, determine the significance of the threat, and either designate air defense artillery systems for engagement or advise units of the passage of friendly aircraft.

Employment of Active Defense Systems

4-30. Effective active air defense requires a mix of weapon types and systems. This balance is required between aircraft, surface-to-air weapons, and guns.

4-31. Surface-launched advanced medium-range air-to-air missile (SLAMRAAM)/Avenger units are employed to protect forces and critical assets as required. Terminal high altitude area defense (THAAD)/Patriot units are deployed individually or as part of an ADA task force to protect early entry forces (opposed/unopposed), airfields, seaports, transportation centers, population centers, theater-level C2 nodes/facilities and geopolitical assets.

4-32. ADA units help to secure the lodgment in entry operations. As the theater develops and entering forces expand into forward positions, ADA units like Patriot support shaping and decisive operations. Some Patriot units move with maneuver forces to provide protection for these forces. Other Patriot units remain at theater and provide air and missile defense of critical assets in the theater rear.

4-33. ADA units protect the maneuver forces and critical assets from fixed and rotary-wing aircraft attacks, CM attacks, and observation by ISR platforms. This protection provides maneuver force commanders the ability to conduct aggressive, as well as sustained defensive operations. The emphasis at the division/brigade level is to destroy enemy aerial threats and ISR platforms.

4-34. Based on the tactical situation, the ADA brigade/battalion commander may task organize to satisfy air defense priorities. The division commander requires corps support for low-to-high-altitude air defense and any reinforcing ADA weapons needed for mission accomplishment. The BCT commanders should use the BCT ADAM cells to ensure AMD capabilities are available based on METT-TC.

PASSIVE DEFENSE OPERATIONS

4-35. Passive defense consists of all measures, other than active defense, taken to minimize the effectiveness of enemy air and missile threats attacking friendly forces and assets. Passive defense measures include camouflage and concealment, dispersion, emission control (EMCON), and operations security (OPSEC).

4-36. To increase survivability, the Battle Command authority directs the ADA fire units to activate or deactivate radar search modes and IFF based on the battalion emission control (EMCON) plan. Communications systems receive an integrated network air picture and transmit it to all ADA fire units, permitting them to remain in EMCON silent, and passive search mode until a potential target is detected. Passive defense measures are employed by ADA units to assist in the survivability of the unit and accomplishment of the tactical mission.

THEATER AIR AND MISSILE DEFENSE

4-37. Due to the political and military aspects of the enemy, TAMD objectives are often strategic in nature. These include deployment for stability/support operations and defense of geopolitical assets. Defense of early entry forces and lodgments can also be strategic objectives since U.S. forces are extremely vulnerable during these stages and U.S. political support for operations must be kept at the highest levels possible.

4-38. The types of passive measures implemented are determined based on the enemy's capabilities and probable means of delivery. Exposure, vulnerability to discovery, location, mobility, surrounding terrain and ability to avoid detection are considered when implementing passive defense measures.

AIR DEFENSE ARTILLERY FORCE PROTECTION IN THE DEFENSE

4-39. Air defense artillery provides vertical dimension protection to the joint force. Army AD protects friendly land forces, bases, lines of communications, and other assets while denying the enemy the freedom to carry out offensive air operations.

DECISIVE OPERATIONS IN AMD

4-40. A decisive operation, in an AMD context, defeats the enemy air and missile attack. In a mobile AMD, the counterattack defended by the fast moving AD systems is decisive in the protection of the force.

4-41. In an area defense, ground commanders closely integrate patrols, intelligence units, and reserve forces to cover the gaps among defensive positions. ADA units can best support by providing protection for logistics support areas and routes. In retrograde operations, some ADA units conduct mobile area defenses or provide static AMD protection as other units execute carefully controlled maneuvers or movement rearward.

4-42. Defeating the enemy air attack within engagement areas is a decisive operation. Throughout the execution of mobile and area defenses, commanders designate a main effort and synchronize fires to support it. If necessary, they shift their coverage to concentrate ADA fires against the air threat.

SHAPING OPERATIONS IN THE DEFENSE

4-43. Shaping operations are executed simultaneously throughout the AO to support the conduct of the defender's decisive operation by upsetting the attacker's design. Friendly forces selectively suppress or neutralize the enemy's air attack capability and disrupt synchronization. Information operations (IO) shape the enemy's perceptions and can influence enemy air avenues of approach, attack profiles, possible landing zone/drop zones, and weapons engagement ranges to ensure all participants understand the enemy air capabilities. The information helps to shape future AMD operations. Fires contribute to shaping operations and create conditions for successful defensive operations.

SUSTAINMENT OPERATIONS IN THE DEFENSE

4-44. Air defense artillery provides the security for sustainment operations in the defense. A primary concern for commanders is organizing forces within the terrain to protect sustainment operations and retain freedom of action. Commanders group ADA forces into bases and base clusters for protection and security. Base and base clusters organize for self-defense. Commanders designate response forces and tactical combat forces to augment base cluster self-defense capabilities.

4-45. In the forward areas of the battlefield, the maneuver commander should submit their high value assets for inclusion to the CAL. ADA units may protect these high value assets such as MSRs, combat/field trains, refueling, and rearming points. In the rear areas of the battlefield, ADA forces concentrate on POL, ammunition, and maintenance facilities/areas. Sustaining the battle for ADA includes missile re-supply along with maintenance and other supplies needed by ADA units.

JOINT COUNTERAIR

4-46. Air superiority is achieved through the counterair mission, which integrates both offensive and defensive operations from all components to counter the air and missile threat Figure 4-1. These operations may use aircraft, surface-to-surface and surface-to-air missiles (SAMs), air-to-surface missiles, special operations forces (SOF), and elements of information operations to counter the threat. Joint forces must be integrated to exploit the mutually beneficial effects of offensive and defensive operations to destroy, neutralize, or minimize air and missile threats, both before and after launch.
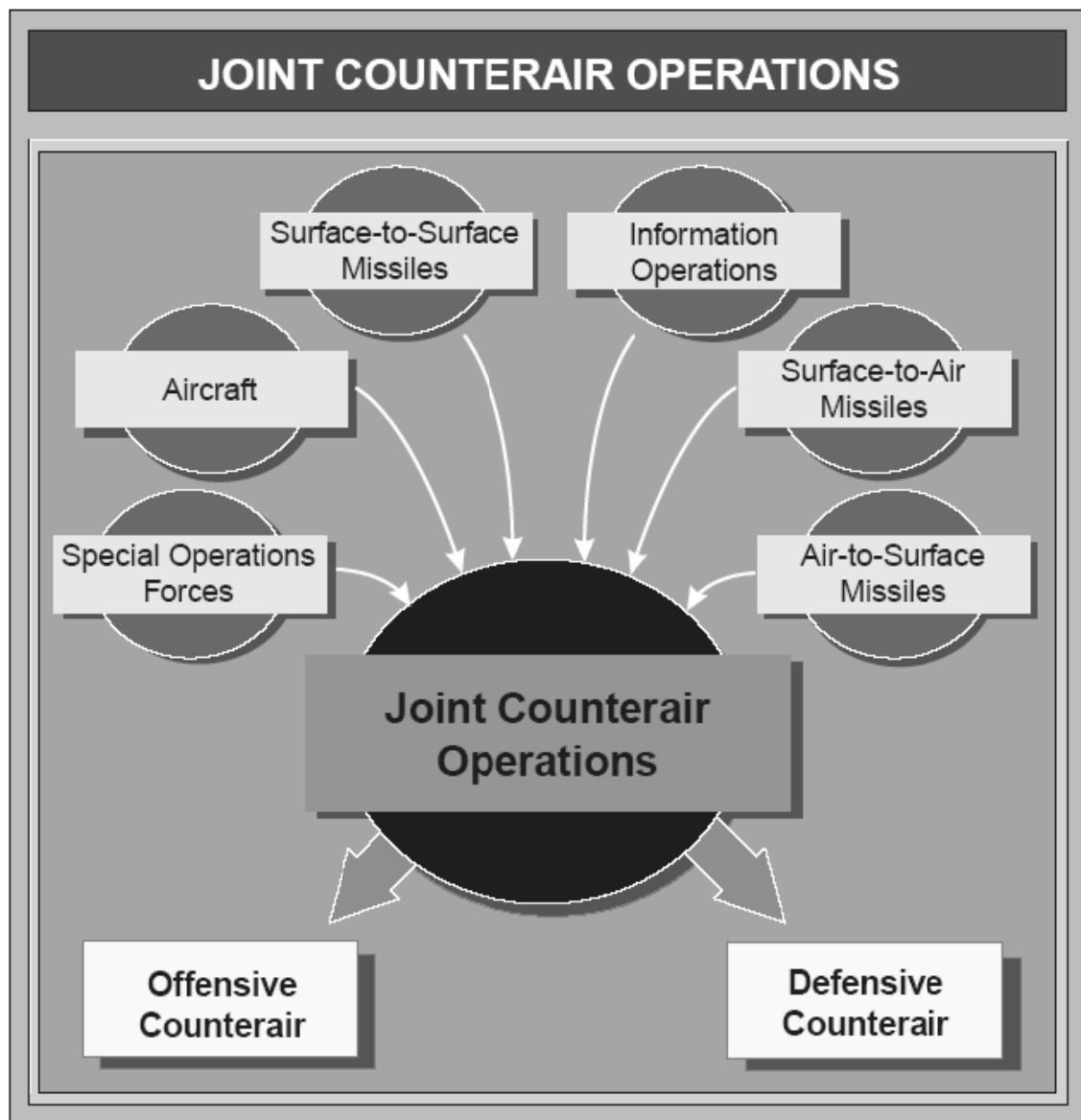
Figure 4-1. Joint counterair

Defensive Counterair Operations

4-47. Defensive Counterair (DCA) is all defensive measures designed to detect, identify, intercept, and destroy or negate enemy forces attempting to attack or penetrate the friendly air environment.

4-48. Freedom of movement is essential to successful defensive operations Figure 4-2. In a hostile air environment, the defending force must establish air defense in depth around critical points, areas, units, and activities. The commander must establish priorities for coverage and assume risk when dedicated ADA resources cannot provide adequate coverage throughout the AO against all possible threats. Successful defenses are aggressive and use direct, indirect, and air defense fires; Information Operations (IO); and ground maneuver to strike the enemy.

Figure 4-2. Defensive counterair operations

Offensive Counterair Operations

4-49. Offensive Counterair (OCA) is offensive operations to destroy, disrupt, or neutralize enemy aircraft, missiles, launch platforms, and their supporting structures and systems as close to their source as possible (JP 3-01).

4-50. This enables friendly use of otherwise contested airspace, enhances freedom of action, and reduces the enemy's air and missile threat to friendly forces. The goal of OCA operations is to prevent the launch of aircraft and missiles by destroying them and their overall supporting infrastructure prior to employment. These operations range throughout enemy territory and are generally conducted at the initiative of friendly forces. OCA consists of attack operations, fighter sweep, escort, suppression of enemy air defenses, and electronic warfare (EW).

ACTIONS BEFORE CONTACT

4-51. Prior to contact, adversaries will attempt to locate our forces using ISR UAS, electronic support measures-equipped aircraft and SOF; conduct air ambushes; attack with long-range rockets, artillery, mortars, and rotary-wing aircraft; and otherwise attempt to disrupt friendly force operational tempo. ADA

forces counter by providing tailored SA and focused EW of air and missile attack to at-risk forces. ADA forces also counter by conducting surveillance, engagements, and conducting counter-ISR operations.

4-52. ADA forces employ passive and active countermeasures against UAS. Passive UAS countermeasures include employing camouflage, concealment and deception techniques. However, employing passive countermeasures hinders the forces freedom to maneuver. The most effective active countermeasure to UAS or other aerial ISR platforms is their destruction in flight by ADA interceptors. Active UAS countermeasures include locating and destroying the UAS prior to launch; destroying the ground control station and/or disrupting/jamming the data link controlling the UAS.

ACTIONS DURING CONTACT

4-53. Once friendly forces come in contact with the enemy, the enemy may employ adaptive tactics in addition to the ones already established in the tactical environment. Maneuver forces initiate decisive contact at the chosen time and place, continue to develop the situation in and out of contact, and integrate maneuver and fires at standoff ranges.

4-54. ADA sensors provide information to C2 nodes to disseminate the continuous tailored air situational awareness and understanding required to prosecute and sustain the engagement, and provides focused early warning to forces at risk. Multiple sensors are needed to maintain coverage for the attacking maneuver elements. ADA sensors are not capable of providing coverage while moving.

4-55. ADA shooters engage threats at optimum times and places within the third dimension of the joint operational environment to maximize probability of kills and minimize collateral damage from debris or fallout. By detecting and destroying UAS and other aerial threats, ADA provides full dimensional protection and continuous tailored situational understanding for the maneuver forces to ensure it can conduct a tactical assault and finish decisively without hindrance from enemy aerial threats.

4-56. ADA prohibits the enemy from influencing the objective area from the third dimension, or the vertical portion of the battlefield. ADA provides continuous tailored situational awareness/understanding to all supported units.

See First

4-57. ADA forces disseminate sensor data to provide tailored air and missile threat SA and focused EW to at-risk forces, deploy sensors to perform surveillance, and conduct counter ISR operations to deny the enemy aerial ISR options.

4-58. ADA sensors conduct surveillance to fill the gaps at critical locations within the operational environment thereby contributing to vertical and horizontal integration of surveillance information. ADA sensors detect air and missile attacks and transmit early warning information to C2 nodes. C2 nodes then fuse the data and disseminate focused EW (and "all clear") to at-risk forces.

4-59. In addition to providing tailored situational awareness and focused early warning information, ADA sensors and operational nodes play a key role in preventing adversaries from collecting ISR information on friendly forces. ADA sensor elements detect aerial ISR platforms at long ranges and enable ADA weapons to engage and destroy these platforms before they can collect and disseminate information.

Understand First

4-60. ADA assists JIIM forces to aggressively shape the operational environment and set conditions for the fight by providing air situational awareness and understanding. ADA integrates into a netted communications system architecture to provide SA/SU information, and fuses sensor data to create a common operational picture to support force-wide understanding of the operational environment and positive airspace control. ADA supports aerial combat identification thereby enabling differentiation between hostile and friendly aircraft.

Act First

4-61. ADA protects JIIM forces and empowers them to take decisive action at the times and places of their choosing by acting first. ADA destroys enemy aerial targets in flight before they endanger maneuver forces.

Finish Decisively

4-62. ADA empowers JIIM forces to win decisively by deterring and destroying aerial threats. Ensuring that no enemy air or missile threat reaches its target supports finishing decisively.

Chapter 5

Stability Operations and Civil Support Operations

This chapter describes the participation of ADA forces in stability operations and civil support operations. Stability operations are conducted outside the U.S. and its territories to promote and protect U.S. national interests. Civil support operations are conducted to address the consequences of natural or manmade disasters, accidents, and incidents within the U.S. and its territories. This chapter describes ADA participation in support of Homeland Security, Homeland Air Security, and counter-drug operations. ADA units may be tasked to provide soldiers and ADA equipment for civil support operations.

CHARACTERISTICS OF STABILITY OPERATIONS

5-1.   Stability operations encompass various military missions, tasks, and activities conducted outside the United States in coordination with other instruments of national power to maintain or reestablish a safe and secure environment, provide essential governmental services, emergency infrastructure reconstruction, and humanitarian relief. Stability operations are normally conducted in noncontiguous AOs and are often time and manpower intensive. Commanders must analyze each defended asset and adapt to the operational framework, factors of METT-TC, and elements of operational design to fit the situation. However, determining the military actions necessary to achieve the desired political end state can be more challenging than offensive and defensive operations.

5-2.   Army forces are trained, equipped, and organized to control/occupy land, populations, and situations for extended periods. ADA forces provide the combatant commanders air and missile defense for protection of JIIM forces allowing flexible options to maneuver commanders to meet theater operational requirements.

5-3.   Stability operations promote and protect U.S. national interests by influencing enemy actions, political ambitions, and information dimensions of the operational environment. They include developmental, cooperative activities during peacetime and coercive actions in response to crisis. ADA forces accomplish stability goals through air defense operations in JIIM operations. The air defense activities that support stability operations are diverse, continuous, and often long-term, as demonstrated in Kuwait after Operation Desert Storm. The purpose is to promote and sustain regional and global stability.

5-4.   Commanders constantly assess the situation in terms of the application and inter-relation of the factors of METT-TC. The enemy is more diverse now than ever before, it has taken on new stressing characteristics and may be encountered in virtually every part of the world. Missions may change as the situation becomes less or more stable. A mission can be as simple as the presence of TMD systems to accomplish a peace enforcement mission.

5-5.   Adversaries may disrupt peacekeeping, peace enforcement, and threaten the stability of a country through acts of aggression, terrorism, or drug trafficking. ADA forces may deploy to: deter aggression; protect critical assets; provide focused early warning; integrate with space based surveillance, joint sensors, and host nation and/or interagency communications system; conduct positive airspace control; employ sensors to detect and track aerial threats to alert host nation authorities; and to support stability operations in crises or before, during, and after the initiation of hostilities.

5-6.   Stability operations include employment of ADA units for defense of populations, forces, and geopolitical assets. During stability operations ADA units are contributors of purely defensive capabilities. Even though combat forces may not be present, the threat may dictate a long term ADA presence overseas.

SECURITY ASSISTANCE OPERATIONS

5-7.   Security assistance operation programs support U.S. national policies and objectives by providing defense articles, military training, and other defense-related services to foreign nations by grant, loan, credit, or cash sales. Examples of U.S. security assistance programs are foreign military sales, foreign military financing, and international military education and training, the economic support fund, arms export control act-licensed commercial sales. ADA forces provide support in security assistance efforts through training, education, and related activities such as humanitarian operations and general support of multinational ADA forces.

5-8.   ADA forces will participate in multinational exercises and operations to improve multinational interoperability and understanding.

HUMANITARIAN ASSISTANCE AND DISASTER RELIEF

5-9.   Humanitarian assistance operations provide emergency relief to victims of natural or man-made disasters when initiated in response to domestic, foreign government, or international agency requests for immediate help and rehabilitation. Disaster relief operations include operations such as refugee assistance, food distribution, medical treatment and care, restoration of law and order, damage and capability assessment, and damage control (to include environmental cleanup or other programs such as firefighting). The Army can provide logistics support to move supplies to remote areas, extract or evacuate victims, establish emergency communications, conduct direct medical support operations, and render emergency repairs to vital facilities. The Army also can provide manpower for civil relief or assist civil authorities with public safety. ADA units may be tasked to participate in this type of operation; however, they are not particularly equipped to perform these tasks due to specialization of authorized equipment. Some examples of an ADA unit providing humanitarian assistance and disaster relief were the firefighting teams provided by ADA battalions during the wilderness preserve fires and the use of ADA transportation assets during Hurricane Andrew disaster relief.

NONCOMBATANT EVACUATION OPERATIONS

5-10. Noncombatant evacuation operations (NEO) relocate threatened civilian noncombatants from locations in a foreign country to regions of safety. These operations may involve U.S. citizens abroad whose lives are in danger. It could also include selected host nation citizens, third country nationals, or members of non-government organizations who may be conducting operations in the area. NEO normally occurs in a peaceful, orderly fashion but may require forcible means.

5-11. ADA forces will support NEO by providing AMD protection of collection points, evacuation routes, and embarkation ports. ADA forces also may be tasked to perform ground transportation of noncombatants using organic vehicles.

COMBATING TERRORISM

5-12. Combating terrorism has two major sub-components: antiterrorism and counter-terrorism. During peacetime, the Army combats terrorism primarily through antiterrorism actions including passive defensive measures taken to minimize vulnerability to terrorism. Anti-terrorism is a form of force protection, and thus, the responsibility of Army commanders at all levels. Antiterrorism complements counter-terrorism, which is the full range of offensive measures taken to prevent, deter, and respond to terrorism. Army elements, such as special operations forces, assist in this interagency effort by applying specialized capabilities to preclude, preempt, and resolve terrorist incidents abroad. Counter-terrorism occurs in conflict and war; antiterrorism occurs across the continuum.

5-13. ADA units may face a terrorist threat during stability operations and must be prepared to implement antiterrorism measures. In addition, if terrorists or other hostile regional powers possess the means to conduct terrorist activities using aircraft, missiles, rockets, or mortars ADA units may be deployed to protect U.S. or host nation forces and facilities.

SHOW OF FORCE

5-14. The U.S. conducts shows of force for three reasons: to bolster and reassure allies, deter potential aggressors, and gain or increase influence within a theater. These shows of force are designated as flexible deterrent options. Shows of force are designed to demonstrate a credible and specific threat to an aggressor or potential aggressor. The presence of powerful and capable ADA forces signals potential aggressors that we are prepared to defend U.S. interests. For extended show of force operations, ADA force commanders may establish deployment rotation options in contingency plans.

PEACE OPERATIONS

5-15. *Peace operations* is a broad term that encompasses multiagency and multinational crisis response and limited contingency operations involving all instruments of national power with military missions to contain conflict, redress the peace, and shape the environment to support reconciliation and rebuilding and facilitate the transition to legitimate governance. Peace operations include peacekeeping, peace enforcement, peacemaking, peace building, and conflict prevention efforts (JP 3-07.3). Army forces conduct the following types of peace operations:

- Peacekeeping.
- Peace building.
- Peacemaking.
- Peace enforcement.
- Conflict prevention.

5-16. Army ADA forces serve as deterrent elements in peacekeeping and peace enforcement operations. ADA systems are visible symbols of U.S. resolve to maintain peace during crises, before hostilities begin, or after conflict is terminated. ADA capabilities are interoperable with Army, joint, and multinational forces. To conduct peace operations, ADA forces will provide protection, situational awareness and understanding, and early warning. They will also provide positive airspace control, when the situation requires, in collaboration with host nation capabilities.

5-17. U.S. military forces will establish secure points or zones throughout noncontiguous areas of operations. Within these areas, ADA forces will provide air and missile protection for U.S. and indigenous forces, facilities, and geopolitical centers. ADA forces will also provide air and missile protection for airbases and USAF aerospace expeditionary forces operating from those air bases.

5-18. ADA forces possess inherent situational awareness and airspace control capabilities. This data will be disseminated via netted and distributed communication system architectures to provide situational awareness and understanding. This enables commanders and staffs to execute current operations and plan for future operations. These capabilities are realized primarily through sensor systems and communications systems. Integrated with space-based surveillance, joint, host nation, and/or interagency sensors and communication systems, ADA forces are postured to conduct positive control in support of aerial operations. ADA sensor and communication system elements provide SIAP, which is a real-time visualization of the airspace. With this visualization comes a commensurate understanding of the aerial operational environment. Near-real and real-time control and integration of planned military and civilian aerial activities will be required to synchronize operations. Collectively, these capabilities support confidence-building measures that facilitate stability and sustain peace. ADA sensors can also provide focused early warning.

PEACEKEEPING OPERATIONS

5-19. Peacekeeping operations support diplomatic efforts to maintain peace in areas of potential conflict. They stabilize conflict between two or more nations, and as such, require the consent of all parties involved in the dispute.

5-20. ADA forces can play major roles in peacekeeping operations. ADA units can be used to deter the threat from using missiles, aircraft, and UAS. ADA units provide key support to these operations in view of the proliferation of offensive missiles. Support to North Atlantic Treaty Organization (NATO) and the

Republic of Korea are prime examples of AMD peacekeeping support. ADA units deployed to Southwest Asia after Desert Storm is another example of peacekeeping operations. Special rules of engagement apply to this type of operation and are usually very restrictive.

5-21. ADA provides capabilities that are critical for other types of peacekeeping operations as well. ADA units are integrated into the joint counterair campaign to enforce no-fly zones and safe havens established by the United Nations. ADA units assist in the identification of aircraft operating in the no-fly zone or safe haven.

PEACE ENFORCEMENT

5-22. Peace enforcement operations are military operations in support of diplomatic efforts to maintain peace between hostile factions. Peace enforcement implies the use of force or its threat to coerce hostile factions to cease and desist from violent actions. Units conducting peace enforcement, therefore, cannot maintain their objective neutrality in every instance. They must be prepared at all times to apply warfighting functions to restore order, separate warring factions, and return the environment to conditions more conducive to civil order and discipline.

5-23. ADA units may play a major role in providing force protection and protection of geopolitical assets from missile or air attack. By denying one of the warring parties the advantage of air power, peace may be maintained. Army ADA has the potential to support the enforcement of no-fly zones.

SUMMARY

5-24. Regardless of the type of stability operations, ADA units will always deploy as force-tailored packages by deploying and/or employing ADA units to accomplish the following:

- Deter aggression.
- Protect critical assets.
- Provide focused early warning.
- Integrate with space-based surveillance, joint and host nation sensors and/or interagency communications systems.
- Conduct positive airspace control using elevated sensors to detect, track aerial drug traffickers, and alert law enforcement agencies.

CHARACTERISTICS OF CIVIL SUPPORT OPERATIONS

5-25. Civil support is Department of Defense support to U.S. civil authorities for domestic emergencies, and for designated law enforcement and other activities (JP 1-02). Civil support includes operations that address the consequences of natural or man-made disasters, accidents, terrorist attacks, and incidents in the United States and its territories. Army forces conduct civil support operations when the size and scope of events exceed the capabilities or capacities of domestic civilian agencies. Civil support operations are usually noncontiguous. Leaders tailor the application of the operational framework, elements of operational design, and METT-TC to fit each situation. Commanders designate the decisive, shaping, and sustaining operations necessary for mission success. However, identifying centers of gravity, decisive points and even the desired end state can be more complex and unorthodox than in offensive and defensive operations. When visualizing a support operation, commanders recognize that they may have to define the enemy differently. In support operations, the adversary is often disease, hunger, or the consequences of disaster.

5-26. The homeland defense mission for ADA is to prevent, deter, or interdict foreign and domestic aerial threats that are directed towards the United States and its citizens or specified area of operations (AO), such as the National Capitol Region. Nations, terrorist groups, or criminal organizations are increasingly likely to attack the U.S. and its territories using missiles and aircraft.

5-27. The homeland air security (HAS) air and missile threat spectrum Figure 5-1 ranges from traditional military threats to terrorist threats, from medium and long range ballistic missiles, bombers to land attack cruise missiles, terrorist-controlled aircraft, and radio-controlled sub-scale aircraft. The use of an air vehicle as a terrorist weapon is the most stressing HAS threat. State-sponsored military threats are addressed by

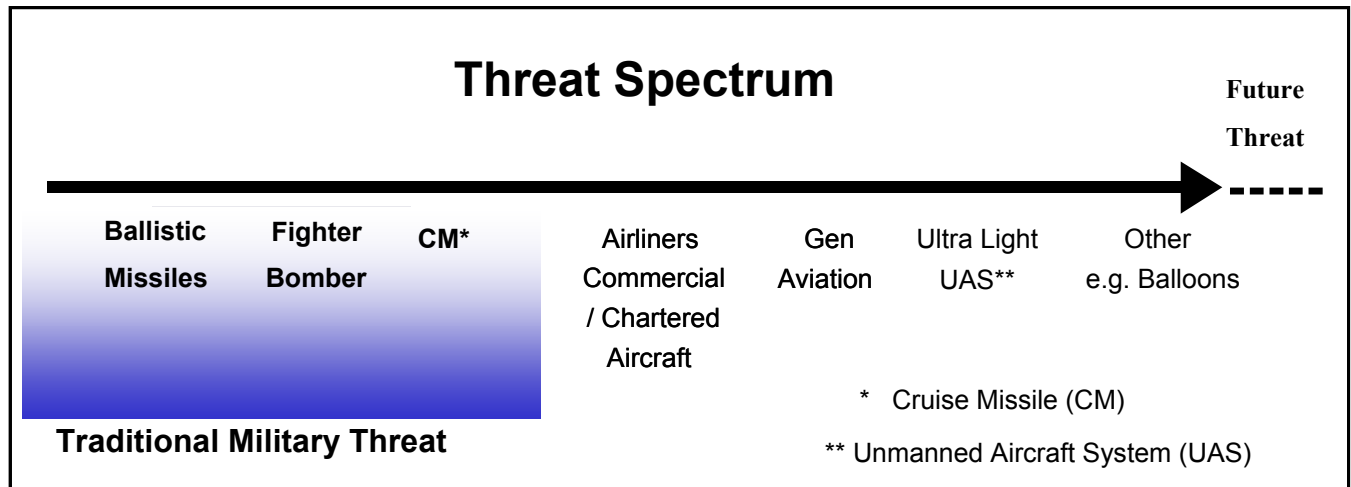war plans, operational concepts, and our military's capabilities. The HAS threat spectrum is depicted below.

Threat Spectrum

Future

Threat

Ballistic   Fighter   CM*   Airliners   Gen   Ultra Light   Other

Missiles   Bomber   Commercial   Aviation   UAS**   e.g. Balloons

                                        / Chartered

                                        Aircraft

*   Cruise Missile (CM)

Traditional Military Threat

** Unmanned Aircraft System (UAS)

Figure 5-1. HAS air threat spectrum

5-28. Government agencies other than the Army will often have the lead in civil support operations. ADA commanders may answer to a civilian chief or may themselves employ the resources of a civilian agency. Command arrangements may often be only loosely defined, causing commanders to seek an atmosphere of cooperation. ADA commanders consider how their actions contribute to initiatives that are also political, economic, and psychological in nature.

5-29. The U.S. Constitution allows the use of Army forces to protect the states against invasion and, upon request of a state, to protect it against domestic violence. Army forces, under joint command, provide the nation with critical capabilities, such as missile defense, necessary to secure and defend the homeland.

5-30. The amended Posse Comitatus Act significantly restricts using federal military forces in law enforcement. The Stafford Act defines and clarifies the role of U.S. military forces in support of domestic civil authorities. Since the law may prohibit certain types of activities, commanders need a detailed analysis of their legal authorities for each mission. Generally, ADA troops and systems performing civil support operations, by the nature of their missions, are in compliance with the law and need only be aware of the limitations of their authority.

ENVIRONMENT

5-31. The Army develops the leadership, organizations, equipment, discipline, and skills useful for a variety of civil support operations. Doctrine for war complements doctrine for civil support operations. Some of the same principles apply to both environments, though modified to accommodate different situations. Properly applied to the situation at hand, these principles balance the Army's response to challenges and confrontations in war and civil support operations.

5-32. Assessments of which civil support operations ADA units support and the extent of participation are presented in the following paragraphs. However, there are no absolutes and ADA units may be called to participate in other operations not addressed. ADA units, as contributors of mostly defensive capabilities, have become the units of choice for several types of civil support operations missions, normally, in support of national interests.

5-33. ADA units perform the planning and support function for conducting many types of civil support operations in coordination with the force commander. Some basic planning questions that apply to each civil support operation follow:

- Are there any special requirements for the personnel participating in the operations?
- What special supplies are required?
- Will special requisitioning procedures be used?
- Have waivers to current Army regulations to allow requisition of special supplies and excessive quantities of supplies outside the normal requisitioning procedures been approved?
- What are the special physical security requirements that must be added to the normal procedures?
- What are the rules of engagement for use of ADA weapons?
- What are the conditions for firing weapons?
- Who authorizes the firing of weapons?
- What role does ADA have in the activity?

KEY ENABLERS

5-34. The smooth and efficient flow of information is at the core of coordinated employment. The following four key enablers have been identified as critical to this information flow:

- Intelligence information sharing.
- Integrated interagency data sharing and communications.
- Common air surveillance picture.
- Automated decision support/response management systems.

INTELLIGENCE INFORMATION SHARING

5-35. A "push-pull" system among agencies ensures that all relevant information on terrorist activities is gathered, correlated, and cross-referenced. The goal is early detection of all air threats. Early detection enables protection against attack and provides decision makers in the Homeland Air Security Coordination Center (HASCC) and other agency command centers with real-time, accurate, amplifying information on an enemy's intent.

INTEGRATED INTERAGENCY DATA SHARING AND COMMUNICATIONS

5-36. A seamless information exchange enables integrated voice and data flow among civilian, military, law enforcement, and emergency response agencies at the federal, state, and local levels. The goal is to enable communication throughout the forces and assets that are responding without relying on cumbersome platform-to-platform or agency-to-agency relay.

COMMON AIR SURVEILLANCE PICTURE

5-37. A high quality common air surveillance picture enables appropriate agencies to make timely and informed decisions on HAS actions. The situational awareness provided by the air surveillance picture provides decision makers with the confidence to make event declarations and interdiction decisions.

AUTOMATED DECISION SUPPORT/RESPONSE MANAGEMENT SYSTEM

5-38. An information management system that provides decision makers with immediate access to critical information to support all levels of decisions and actions. Examples are information on such things as: air interdiction assets available with their location and response times, affected law enforcement jurisdictions, preferred divert airfields appropriate for force-down according to aircraft type, locations and phone numbers for nearest local law enforcement and emergency/disaster response forces, and emergency equipment types and locations.

BALLISTIC MISSILE DEFENSE SYSTEM (BMDS) INTEGRATION

5-39. BMDS provides a layered defense capable of countering threat missiles in all phases of flight, and provides early warning about missile launches, The **Integrated Tactical Warning/Attack Assessment** (ITW/AA) system distributes launch warnings to civilian and military authorities.

5-40. The **Command and Control, Battle Management Communications (C2BMC) network** mission is to defend the United States against a limited strike of Intercontinental Ballistic Missiles (ICBM) from rogue nations, and unauthorized or accidental launches from nations with weapons of mass destruction (WMD). The GMD element uses a combination of shared and dedicated components that includes the following sub-systems:

- GMD Battle Management, Command and Control and communications network.
- In-Flight Interceptor Communications System.
- Long range sensors, including Upgraded Early Warning Radars and a sea-based X-Band Radar, AEGIS Long Range Search and Track, AEGIS Spy-1, and Forward-based X-Band Radars (TPY-2).
- Ground Based Interceptor emplacements, consisting of a silo-based ICBM-class booster motor stack and the exo-atmospheric Kill Vehicle.

5-41. **Ballistic Missile Defense System** (BMDS) related applications are an integral part of AMD operations. These systems and applications support IPB, target cueing, communications and data exchange, and battle damage assessment.

- Protection—ADA forces will be capable of protecting U.S. and friendly assets by engaging and destroying hostile missiles.
- Prevention—ADA forces will provide a credible deterrence to potential adversaries through the deployment and demonstration of ADA system capabilities.
- Negation—ADA forces will combine with other U.S. space and space-related assets and negate hostile access to, or use of, U.S. or other assets through deception, denial, disruption, degradation, and destruction.
- Surveillance—ADA forces will assist in performing surveillance and exchanging C2, communications system, and ISR information.

HOMELAND SECURITY

5-42. Homeland Security is a national effort to coordinate government agencies. The Department of Homeland Security prepares for and mitigates the consequences of terrorist threats or attacks within the U.S. In performing this function the department works with federal, state, and local agencies, and private entities to coordinate efforts to prevent terrorist attacks within the United States. The department also works with the military services commanders to protect the U.S. and its critical infrastructure from state-sponsored attacks or terrorist attacks.

5-43. A recent example of ADA in homeland defense involves Avengers and Sentinels protecting our nation's capitol. The following article and picture Figure 5-2 illustrates a defensive reaction to the 9/11/2001 attacks.

> **OPERATION CLEAR SKIES**
> **Air Defenders Deploy to Defend National Capital Region Against Terrorist Aerial Attacks**
> by MAJ. Rousell Thomas and MAJ. Kevin Hutchison
>
> "Clear Skies" is the name of a series of air defense exercises and operations conducted by joint and interagency entities in the aftermath of the terrorist attacks on 11 September 2001. Following these attacks, the Director of the Joint Staff initially tasked the Joint Air and Missile Defense Agency (JTAMDO) to assume the lead role for developing long-range operational concepts and architectures for the Homeland Air Defense (HAD) mission areas (the National Capitol Region—Washington, D.C.—and other key U.S. sites) in coordination with the North American Aerospace Defense (NORAD) Command and the Armed Forces. HAD is a subset of the interagency Homeland Air Security (HAS) mission.

Figure 5-2. An Avenger protects a high-value asset

HOMELAND AIR SECURITY

5-44. The homeland air security/air defense mission is to deter, prevent or interdict aerial threats and aggression directed towards the United States. HAS complements other homeland defense and security missions including Land and Maritime Security. HAS is dependent on close integration, cooperation, coordination, and collaboration among international, federal, state, local agencies and governments. The main focus of HAS is on counter-air terrorism. It employs the full spectrum of agency capabilities, from intelligence to law enforcement to military force, to complete the mission. The amalgamation of individual agency capabilities into an integrated, multi-layered response is the lynchpin of HAS.

EMPLOYMENT

5-45. HAS is centered around four phases with elements that range from event recognition to event reconstruction. Although sequentially phased, HAS execution/employment may not always flow sequentially from phase to phase.

5-46. Throughout these phases, intelligence collection supports decisions and actions. The key to successful intelligence gathering is detailed intelligence preparation that enables predictive analysis of the terrorist threat. Intelligence preparation determines likely terrorist aerial threat courses of action and associated alternatives. Intelligence also describes how they organize and the environment within which they may conduct operations. This process contributes to the identification of gaps in knowledge of the threat, forming the basis for intelligence requirements in each of the four phases.

5-47. The foundation of the four phases is the development of national and agency policies, plans, and procedures that lead to the establishment of a non-permissive environment, to enhance deterrence. Examples include: regulatory changes that require hardening of cockpit doors, policy changes increasing the number of Air Marshals, and federalizing airport security screening personnel. The four phases of the HAS concept are recognition, assessment and warning, interdiction, and recovery and follow-up. These phases are described below and illustrated in Figure 5-3.

- Phase 1–Recognition**.** Implementation of policy, procedures, plans, training, and education that combine to create an environment of awareness. Trigger events are created by awareness of a terrorist act, the preparation for a terrorist act, recognition of other illegal air activity by some agency, the public of abnormal activity.
- Phase 2–Assessment and Warning. Following recognition of a trigger event, an evaluation process occurs which potentially includes one or more of focused surveillance or enhanced intelligence collection in order to confirm whether or not a terrorist act is being planned or underway. Simultaneously, when the necessary information is available, specific response plans and actions are initiated, including focused warnings to threatened areas or facilities.
- Phase 3–Interdiction. Once an assessment is complete and depending on how the threat determination is made, interdiction actions are taken to prevent the launch/takeoff of a threat air vehicle. If airborne, interdiction actions will be used to neutralize the air threat. This phase requires the ability to seamlessly transition between law enforcement and military actions.
- Phase 4–Recovery and Follow-Up. After interdiction has been completed, recovery and follow-up is necessary. Notification and transition of responsibility is then made to the appropriate agencies for disaster response and consequence management. Then a formal HAS event termination is issued.
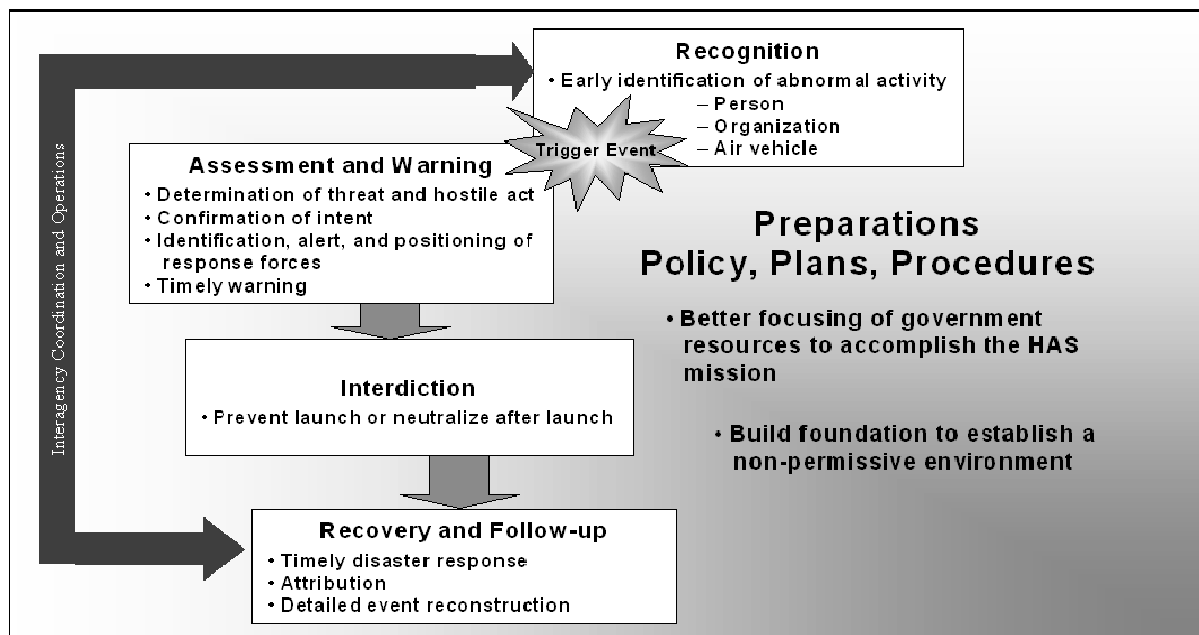

Figure 5-3. Four phases of the HAS concept command and control

5-48. A standing Homeland Air Security Coordination Center (HASCC) plans, coordinates, and synchronizes air security operations. It coordinates all HAS operations, whether day-to-day operations, a

national special security event or a HAS trigger event. The coordination center is manned by representatives from all appropriate federal agencies which contribute to the HAS mission. The HASCC is tailorable and scaleable to meet specific HAS requirements. The HASCC is survivable, providing continuity of operations, with robust command, control, and communications systems. These systems are interoperable, responsive, and sustainable in both benign and hostile environments. The main tasks the HASCC performs include the following:

- Lead the interagency process to develop a HAS plan, ensuring integration with the Land and Maritime Homeland Security missions.
- Focal point for interagency air security intelligence information.
- Assess HAS trigger events to determine the appropriate course of action (COA).
- Declare HAS events.
- Coordinate and synchronize interagency responses to HAS events.

5-49. Supporting agencies develop their own unique plans to support the overall mission of the HASCC and define their supporting roles. These plans feed into a coordinated interagency process. The homeland air security director (HASD) coordinates and synchronizes execution of the HAS mission. The HASD is responsible for leading the interagency development of air security objectives and plans, coordinating with supporting agencies, and managing execution of the HAS plan. The HASD is responsible for the following:

- Assessing trigger events and supporting information.
- Declaring HAS events.
- Initiating and terminating event responses.
- Synchronizing agency responses to HAS events.
- De-conflicting and/or elevating policy matters to the appropriate level for resolution.

5-50. National Executive Coordination Centers provide notification and situational awareness for the executive level of government. The HASCC, as well as departments and agencies, must coordinate with these centers as appropriate. International/Allied participation within the command and control structure is needed but has yet to be determined.

SUPPORT TO COUNTER DRUG OPERATIONS

5-51. Military efforts support and complement, rather than replace, the counterdrug efforts of other U.S. agencies, the states, and cooperating foreign governments. Army support can occur in any or all phases of a combined and synchronized effort to attack the flow of illegal drugs at the source, in transit, and during distribution. Army participation in counterdrug operations will normally be in support of law enforcement agencies.

5-52. Support to host nations includes assistance to their forces to destroy drug production facilities; collaboration with host nation armed forces to prevent export of illegal drugs; and nation assistance to help develop economic alternatives to production, exportation, and distribution of drugs. Support to interdiction efforts center on monitoring and detecting illegal drugs in transit as well as integrating command, control, communications, and intelligence systems. U.S. forces may well assist host nation forces at war while they are in stability and support operations postures.

5-53. Support for domestic counterdrug operations includes military planning and training assistance for domestic law enforcement agencies, participation by the National Guard, equipment loans and transfers, use of military facilities, and other assistance as requested and authorized. This support may expand as national policy and legal prohibitions evolve.

5-54. ADA sensor surveillance will be the primary role for ADA units. ADA sensors are ideally suited to provide surveillance support to this type of operation. This support will normally be provided to U.S. Customs and Border Patrol organizations along the U.S. borders. The forward-looking infrared (FLIR) is a heat sensor that can track people coming across the border. FLIRs are mounted on Avengers. Sentinel radars and Joint Land-Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS) can be used to support counter drug operations by detecting and tracking low-flying aircraft approaching and penetrating the border.

Chapter 6

Army ADA and Information Superiority

This chapter describes the Army ADA contribution to and benefit from achieving information superiority. Information superiority is the operational advantage derived from the ability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same. Information superiority is the product of intelligence, surveillance, and reconnaissance (ISR), information management (IM), and information operations (IO). Information superiority enables ADA forces to see first, understand the situation more quickly and accurately, and act faster than their adversaries.

CHARACTERISTICS OF INFORMATION SUPERIORITY

6-1. Adversaries and enemies pursue their own relative information advantages, very likely in asymmetric ways, while continually attempting to deny information superiority to friendly forces. Because opposing forces constantly adapt and situations continually evolve, information superiority is only possible through constant vigilance. Commanders assess the quality of their own information against their decision-making requirements. Against that assessment, they estimate the quality of the enemy's operational picture. Commanders avoid any complacency associated with relative levels of military technology. They are aware that their enemy may, by chance or countermeasures, uncover the sources of friendly informational advantage, block them, or use them to deceive.

6-2. Commanders recognize that unless they envision and direct operations designed to achieve and maintain information superiority, they may lose it. Commanders exploit any advantages in information capability and intelligence to increase the effects of combat power. They constantly seek to improve their situational understanding and to assess that of their enemy. They know that losing information superiority may result in losing the initiative.

6-3. The ADA perspective on information superiority is characterized by gaining, maintaining and distributing timely and accurate information on the three-dimensional positions, vector, and track identification (friend, foe, or neutral) of all aircraft. TBM impact point predictions are also information sets needing immediate attention. ADA units deny information to the enemy using OPSEC and communications security, and by practicing electronic emission control. ADA denies the enemy the ability to observe and target friendly forces by engaging and destroying UAS in flight. By cutting the link between enemy commanders, and their eyes, ADA causes the enemy to operate in the blind, to be reactive to U.S. operational initiatives, and to lose offensive potential.

6-4. Friendly forces must rapidly collect, process and disseminate information to permit combat units to operate in depth and maintain initiative, agility, and synchronization. The force's dependence on the prompt flow of information makes battle command centers prime targets for enemy air and missile operations. Therefore, the protection of battle command nodes is a key objective of air and missile defense operations.

THE INFORMATION ENVIRONMENT

6-5. The information environment is the aggregate of individuals, organizations, or systems that collect, process, or disseminate information; also included is the information itself. The climate, terrain, and weapons effects (such as electromagnetic pulse or blackout) affect the information environment but are not part of it. The information environment includes the C2 nodes of friendly and enemy forces and those of other organizations and groups. Commanders consider the explosive growth of information and the

pervasive nature of the information when they visualize an operation. They include that part of the information environment that affects their operation in their operational environment.

6-6. Distance has little meaning in the information environment. Army information systems are "in contact" with enemy information systems before any operation starts. They remain in contact after the operation ends. Commanders understand that there is no sanctuary for friendly information. Before Army forces arrive in theater, the battle for information superiority begins.

6-7. Army ADA information systems include C2 nodes at the AAMDC and ADA brigades/battalions, sensors (THAAD, Patriot and Sentinel radars), and joint communications networks, Patriot's multi-routed, multi-channel network, EPLRS, and combat net radios). The joint data net (JDN) is the primary data exchange network in the ADA environment.

6-8. The JDN is the collection of near real time communications and information systems used primarily at the coordination and execution levels. It provides information exchange necessary to facilitate the joint-service battle manager's comprehension of the tactical situation and provides the means to exercise C2, communications system and intelligence, surveillance, and reconnaissance (ISR) beyond the range of organic sensors. The JDN carries near real time tracks, unit status information, engagement status, coordination data, and force orders. The JDN can provide information to cue sensors as well. The backbone of the JDN is Link 16 transmitted via the joint tactical information distribution system (JTIDS) and multifunctional information distribution system (MIDS) terminals. However, other data links such as TADIL A, B, or C, Link 22, and variable message format (VMF) will exchange information with the JDN through gateways at various platforms to ensure that all participating users are included in the JDN for AD. Satellites link geographically dispersed users in near real time without consuming limited tactical bandwidth.

RELEVANT INFORMATION

6-9. Commanders must understand, visualize, describe, and direct efforts that contribute to information superiority. These contributors fall into the following four primary areas:

- Army information tasks—tasks used to shape the operational environment.
- Intelligence, surveillance, and reconnaissance—activities conducted to develop knowledge about the operational environment.
- Knowledge management—the art of using information to increase knowledge.
- Information management—the science of using information systems and methods

6-10. Commanders and staffs can use ADA generated/related information to analyze and comprehend the air-ground situation and to determine relevant gaps, potential enemy options/actions, the consequences of friendly actions, and the effects of the information environment on friendly and enemy actions. These contributors enable and complement full spectrum operations. This information and its products enable commanders to accomplish the following:

- Develop and maintain a comprehensive picture of enemies and adversaries; forecast their likely actions.
- Deny enemy and adversary information about friendly ADA forces and operations through the use of radar emission control (EMCON) procedures.
- Influence enemy perceptions as to the positions of friendly ADA forces.
- Influence defense of critical and geopolitical assets.
- Provide relevant information (including targeting and intelligence) to support the decision making process.
- Synchronize airspace essential to successful three-dimensional air and ground combat operations.

6-11. Because of the large quantity of data available, it is especially important for commanders to establish information priorities in order to focus their staffs during their data collection. These priorities must address the relevant information to the specific air and missile defense operations. The commander provides this focus via commander's critical information requirements (CCIR), 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 CCIR must be reported to the commander by the most rapid and effective means).

6-12. Commanders determine the relevant information for each operation. CCIRs are always promulgated by a plan or order and are an essential part of planning. The commander alone decides what information is critical based on the mission, experience, and the higher echelon commander's intent. The staff may recommend CCIR to the commander as—

- Friendly forces information requirements (FFIR) to allow the commander to determine the combat capabilities of their own or adjacent friendly units (how I see myself).
- Priority intelligence requirements (PIRs) to determine what the commander wants or needs to know about the enemy, their purpose, and/or terrain (how I see the enemy).

6-13. Essential elements of friendly information (EEFI) to allow the commander to determine how to protect the force from the enemy's information-gathering systems (how can I prevent the enemy force from seeing me) although EEFIs are not CCIRs, they have the same priority. An EFFI establishes an element of information to protect rather than one to collect. EEFIs identify those elements of friendly force information that, if compromised, would jeopardize mission success.(FM 3-0)

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

6-14. Intelligence, surveillance, and reconnaissance (ISR) integration is an activity that synchronizes and integrates the planning and operation of sensors, assets, and processing, exploitation, and dissemination systems in direct support of current and future operations. ISR integration is fundamental to information superiority. Thoroughly integrated ISR operations add many collection sources. ISR integration eliminates unit and functional "stovepipes" for planning, reporting, and processing information and producing intelligence. It provides a common mechanism for all units to conduct ISR operations in a coordinated, synergistic way.

6-15. ADA units can produce some intelligence products which can be disseminated via Link-16. ADA units perform aerial surveillance using organic sensor systems; they do not perform reconnaissance. Aerial surveillance is not the sole domain of Army ADA; it is a joint/multinational endeavor.

INTELLIGENCE

6-16. Intelligence is the product resulting from the collection, processing, integration, analysis, evaluation, and interpretation of available information concerning foreign countries or areas. Intelligence is also defined as information and knowledge about an adversary obtained through observation, investigation, analysis, or understanding. Intelligence sources may provide indications of imminent hostile activity, potential early warning, and positive hostile identification before detection by the air defense system.

6-17. The complexity of the operational environment requires sharing intelligence from the national level to the tactical level and among headquarters at each level. Modern information systems allow analysts to collaborate on the overall analysis without degrading support to their own commanders, regardless of their geographic dispersion. This distributed, collaborative analysis process starts with the initial intelligence preparation of the battlefield (IPB) and continues throughout operations.

6-18. ADA commanders use intelligence information to predict likely aerial avenues of approach, TBM launch areas, aircraft types and numbers, and potential carriers of WMD. Intelligence is used to predict enemy intent thereby contributing to the identification of prioritized critical assets to defend. The information gathered through intelligence supports the development of the AADP and defense designs.

SURVEILLANCE

6-19. Surveillance is the systematic observation of aerospace, surface or subsurface areas, places, persons, or things by visual, aural, electronic, photographic or other means. Surveillance, in an ADA context,

involves electronic observation, using radar, of the airspace above and outside the area of operations. Surveillance is a continuous function before and during hostilities except when the radars relocate. During relocation, other Army and joint TAMD radars provide continuity and complete coverage of the third dimension.

6-20. Surveillance information is shared and distributed among Army and joint TAMD systems. This information is used to cue fire control radars and weapon systems to potential targets. ADAM Cells distribute surveillance information as early warning and aerial situation awareness to non-ADA units. Surveillance information can also be used to support airspace management and control.

RECONNAISSANCE

6-21. Reconnaissance is, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. ADA commanders can request a reconnaissance mission be initiated to gather information on potential aerial threat support or launch facilities that were not identified through prior intelligence gathering.

INFORMATION MANAGEMENT

6-22. Information Management (IM) is the science of using procedures and information systems to collect, process, store, display, disseminate, and protect knowledge products, data, and information. More information on IM can be found in FM 3-0 chapter 7.

INFORMATION SYSTEMS

6-23. Information systems are the equipment and facilities that collect, process, store, display and disseminate information. These include computers and communications as well as policies and procedures for their use. Information systems are integral components of communications system and Intelligence. Effective information systems automatically process, disseminate, and display information according to user requirements. IM centers on the commander and the information relevant to C2. Commanders make the best use of information systems when they determine their information requirements and focus their staffs and organizations on meeting them.

INFORMATION SUPERIORITY EXECUTION

6-24. To aid information superiority force protection combines operations security (OPSEC) and deception operations, to help keep the enemy from locating friendly units. Proper dispersion helps reduce losses from enemy fires, as does the use of camouflage, discipline, counter-reconnaissance, security operations, and fortified fighting positions. Air defense contributes to counter-reconnaissance by destroying UAS and aircraft ISR operations against the force. Frequent moves disrupt the enemy ISR cycle. These measures help commanders protect their force from enemy observation throughout the conduct of operations.

6-25. Communications connectivity is essential to information superiority in that it supports the coordination, synchronization, collaboration, and exchange of information that exists between C2 nodes. TAMD interoperates through multi-data link networks. These information exchanges between organizations at all echelons support decision-making, planning, and strategy development. Intelligence collaboration between units ensures that available information is fused and limited collection resources are fully utilized. Communications architecture provides the paths to broadcast early warning information generated by satellite and surface-based sensors to appropriate TOCs. ADA implements EMCON silent procedures to prevent the enemy from detecting ADA sensors.

6-26. Passive measures are used to deceive, frustrate, and surprise enemy air and surveillance assets. Some examples at the operational level are moving large units at night, developing an early warning system, creating large area smoke screens, and establishing emissions control (EMCON) procedures. Some examples at the tactical level are employing radar scattering camouflage, utilizing early warning instead of local sensors, and locating units on hardened sites.

NETWORK APPLICATION MANAGEMENT

6-27. Networking technologies are expanding the options available for managing the flow of information. Brigade headquarters can achieve a collaborative environment for sharing information using web pages, public folders, and e-mail. For example, networks provide the brigade access to non-secure and secure information, allowing individuals to send and receive unclassified and classified information worldwide. The Non-Secure Internet Protocol Router Network (NIPRNET) provides access to the Internet. Secret Internet Protocol Router Network (SIPRNET) provides access to classified information.

6-28. The intranet is a communications network where access to published information is restricted; this applies to installations and to operational and tactical headquarters. The communication standards of the internet and the content standards of the World Wide Web (www) are normally the basis for a joint task force intranet. Therefore, the tools used to create an intranet are normally identical to those used for Internet and web applications using local area networks (LANs) protected by firewalls.

Tactical Internet

6-29. The tactical Internet is the term used to describe the integrated operational environment communications network. The term is appropriate due to functional similarities to the commercial Internet and because the Tactical Internet communications infrastructure is based on Internet technology. A key feature is the ability to exchange messages using the commercially based Internet Protocol.

6-30. At the brigade and below, the Tactical Internet extends Army battle command systems (ABCS) to the Soldier and weapons platform. The Tactical Internet passes battle command and situation awareness data. The Tactical Internet provides tactical, mobile, simultaneous multi-band, multi-node, voice and data (possibly video) communications along with routing and network services.

6-31. Initial digital communications support consists of a space-based segment, an EPLRS-based backbone, a SINCGARS combat net radio (CNR) segment, and a mobile subscriber equipment/tactical packet network segment, all integrated via routers. The integrated digital transport capability of these communications segments is key to moving information among nodes and platforms. The communications infrastructure is focused on achieving seamless information transfer horizontally and vertically across the operational environment.

6-32. The tactical Internet supports several key services. These services include functions such as electronic messaging, directory, network management, and security. These services are integral to the value of the Tactical Internet in support of the warfighter. As new host-based services are added—such as electronic mail service—their supporting system components will be folded into the Tactical Internet (Figure 6-1).
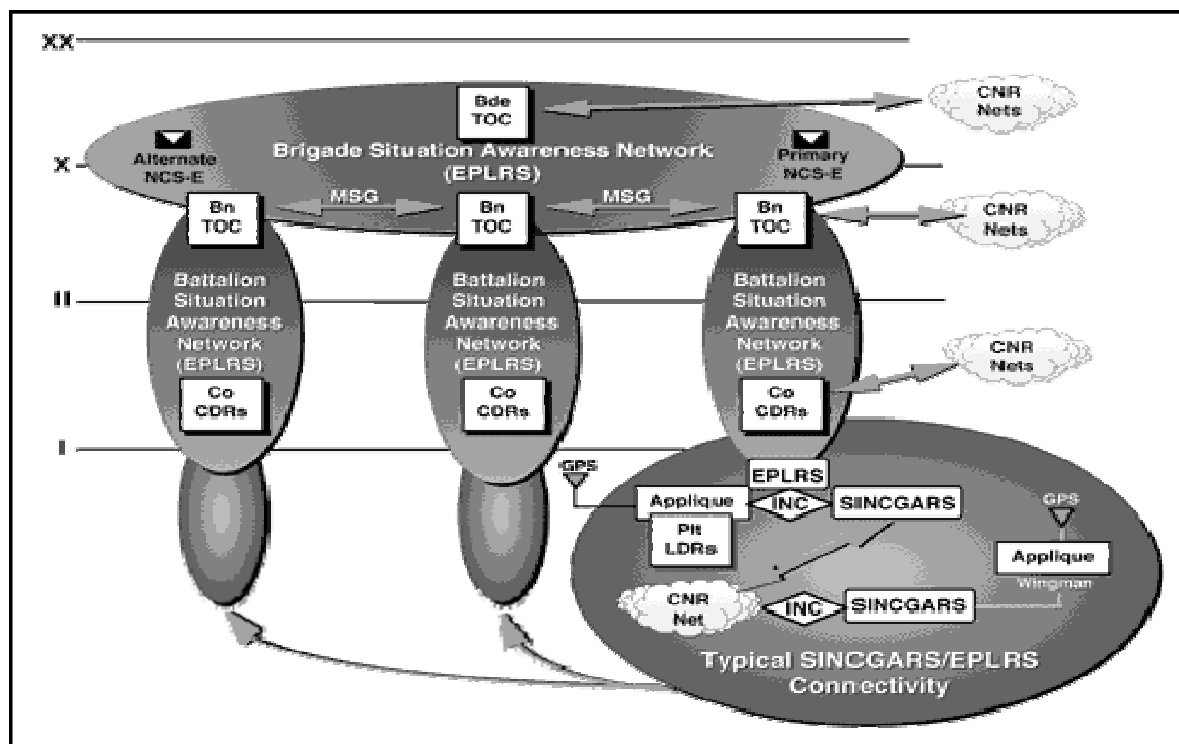
Figure 6-1. Simplified tactical Internet components at brigade level

6-33. The Tactical Internet is a Secret-High system. Since all directly connected host computers are capable of operating up to the secret level, direct connections to the commercial Internet are not currently permitted.

Electronic Mail (E-mail)

6-34. E-mail is a system of transmitting messages and data from one computer to another, using telephone connection and modems. E-mail is replacing formal messaging systems to communicate record copy information between military users. E-mail uses non-tactical computers (laptops) and tactical or non-tactical telephone systems. E-mail permits

6-35. rapid and asynchronous communications, eliminating "telephone tag." It permits a single user to communicate with one or several users simultaneously. To reduce e-mail overloads, functional versus individual e-mail accounts can be established. This helps prevent a message backlog for personnel not on a shift. Establishing a precedence system within e-mail permits timely handling and review of priority messages.

BALLISTIC MISSILE DEFENSE SYSTEM SUPPORT

6-36. BMDS systems are an integral part of the overall deterrent posture of the Army. They confer a decisive advantage upon U.S. and friendly forces in terms of combat timing, operational environment awareness, operating tempo, synchronization, ability to maneuver, and application of firepower. Space-based warning systems provide warning of ballistic missile attack and other intelligence information to either national or theater warning systems. BMDS systems can provide longer-range warning than airborne or surface based sensors.

Missile Warning

6-37. The Defense Support Program (DSP) is a survivable and reliable satellite-borne system that uses infrared detectors to sense heat from missile plumes against the earth background. DSP will detect and ground-processing stations will report in near real-time missile launches and nuclear detonations. Its primary mission is to support the integrated Tactical Warning and Attack Assessment (ITW/AA) mission. Currently, DSP is slated to be replaced by the space based infrared system.

6-38. The theater event system (TES) is the United States Strategic Command (USSTRATCOM) missile detection and warning architecture that provides reliable, comprehensive tactical warning support (assured warning) to theater elements. USSTRATCOM coordinates tactical warning via a system of systems with similar tactical support missions: JTAGS, mission control station, and Tactical Detection and Reporting. These programs constitute the TES and mutually support each other in the mission of tactical missile and other event reporting to theater. Within two to four minutes of launch, the theater commander is provided tactical missile launch warning data, including the place of launch, time of launch, and a course azimuth. This warning information can be used to alert friendly forces (defensive weapon systems such as air and missile defense systems) and attack systems.

JOINT TACTICAL GROUND STATION

6-39. JTAGS is a transportable information processing system that receives and processes in-theater, raw, wideband infrared data down linked from DSP sensors. The system disseminates warning, alerting, and cueing information on theater ballistic missiles and other tactical events of interest throughout the theater using existing communications networks.

6-40. The mission of JTAGS is to provide near real-time reporting of TBM mission event data and other infrared events of interest to the end user in theater. Operators accomplish this by processing IR data obtained from DSP satellites and then transmitting information on various global and in-theater tactical data networks as well as providing voice warning to select units in theater as designated by the combatant commanders of each supported theater. JTAGS currently utilizes the Integrated Broadcast Service-Interactive, Integrated Broadcast Service- Simplex, and Link-16 (TADIL-J) data networks to pass TBM warning data and the Defense Red Switch Network as well satellite communications voice networks to pass voice warning to users in theater.

6-41. JTAGS determines the TBM source by identifying missile launch point and time and provides an estimation of impact point and time. Since the system is normally located in theater, it reduces the possibility of single point failure in long-haul communication systems and is responsive to the combatant commanders. JTAGS is an essential link for the combatant commander's situational awareness. Operational benefits include the following:

- Cueing attack operations assets to find and destroy enemy launch capability.
- Timely warning for the protection of friendly forces and populations.

6-42. JTAGS receives direct down linked data from up to three DSP sensors. Features include the following:

- Threat TBM infrared data.
- 3-D stereo processing of multiple sensor downlinks.
- Real-time reporting.
- Robust multi-networks capability.
- In-theater data/voice communications.

6-43. JTAGS is an Army system ADCON to SMDC/ARSTRAT and 1st Space Brigade. Army crewmembers are MOS 14J, Air Defense C4I TOC Enhanced Operator/Maintainer.

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Chapter 7

Sustainment

Sustainment of Air Defense Artillery (ADA) organizations presents unique challenges to the commanders and staffs of these organizations. Although the basic sustainment requirements are the same as all Army organizations, the diverse method in which ADA units are employed and the highly complex nature of the systems demand a focused approach to sustainment. The Army sustainment structure has undergone a dramatic change in both organizations and operations which affects the manner in which sustainment is provided to units. It is imperative that commanders and staffs have a complete understanding of modular sustainment organizations and operations to ensure timely and sufficient support. This chapter outlines the basic tenants of modular sustainment to identify potential sources of sustainment support for ADA units. Based upon the information provided, commanders, with support from their staff, must be proactive to identify and leverage available support.

MODULAR SUSTAINMENT

7-1. For decades, each Army warfighting echelon had its own combat service support structure. This approach produced redundant structures and capabilities throughout the Army that provided limited flexibility in responding to a wide range of operational challenges. The challenges were met, but at high costs in organizational turbulence, inefficiency, and slower response times than were desired. Today, technological advances, modular unit designs, and revised doctrine have provided for increased efficiencies and greater effectiveness in supporting full spectrum operations. One example is the elimination of redundant logistic capabilities at the corps and division levels. This restructured hierarchy enabled more centralized command and control (C2) and decentralized execution of intra-theater distribution system operations and sustainment operations.

7-2. FM 4-0, the Army's keystone field manual for sustainment, has detailed descriptions of the sustainment organizations that support the modular Army. Sustainment organizations that will have a direct impact on air and missile defense sustainment are described later in this chapter.

SUSTAINMENT OVERVIEW

7-3. Sustainment is the provision of logistics, personnel services, and health service support to maintain and prolong operations until successful mission accomplishment. The Army warfighting function, sustainment, is the related tasks and systems that provide support and services that not only enable freedom of action and extend operational reach but also mission accomplishment. It includes the functions of personnel services, logistics, and health service support.

- Personnel services include human resources support, financial management, legal support, religious support, and band support functions related to Soldiers' welfare, readiness, and quality of life.
- Logistics is the military art and science of carrying out the movement and maintenance of forces. Logistics includes maintenance, transportation, supply, field services, distribution, operational contract support, and general engineering support.
- Health service support includes all support and services performed, provided, and arranged by the appropriate medical command (deployment support) to promote, conserve, or restore the mental and physical well being of Army personnel and, as directed personnel in other Services,

agencies, and organizations. This includes casualty care, medical evacuation, and medical logistics.

7-4.   In order to effectively support operations in a fully integrated and interdependent joint environment, Army transformation efforts produced a total organizational redesign of combat service support units. A new modular unit design was developed for greater flexibility and increased responsiveness in meeting current and projected future operational requirements.

7-5.   Finance, human resources, and medical proponents experienced similar transformation efforts that brought about changes to organizations and methods of employment. For example, financial management operations are now conducted by standardized financial management structures, and finance support and resource management capabilities are integrated to provide improved operational capabilities.

SUSTAINING ADA ORGANIZATIONS

7-6.   Successful sustainment operations are contingent upon an understanding of requirements, capabilities, priorities, and the operational environment. The objective is responsive and agile support at the right place, at the right time, and in the right quantity. The purpose is to build and sustain combat power and provide for operational endurance. The following paragraphs, by sustainment function, provide the basis for understanding how operational level sustainment capabilities are structured to support ADA sustainment requirements within a theater, theater of operations, or JOA.

PERSONNEL

7-7.   The paragraphs below address human resources (HR) support and financial management support. For information on the remaining components of the sustainment function and personnel, see FM 4-0 and FM 1-0.

Human Resources (HR) Support

7-8.   HR support to ADA units is provided by TSC sustainment brigades that provide support on an area basis within their specified area of operations. This realignment of HR capabilities is the result of the emergence of the sustainment warfighting function, clarifications of definitions, and the loss of traditional HR C2 structure above company level in the modular force structure.

7-9.   Depending upon the major mission a sustainment brigade performs, theater opening, theater distribution, or sustainment, it will conduct C2 of HR companies, military mail terminal (MMT) teams, and/or theater gateway R5 teams as appropriate to its mission. A human resources sustainment center (HRSC) that functions as a staff element of the TSC provides technical guidance and ensures execution of HR support as defined by the policies and priorities established by the Army service component command (ASCC) G-1. A sustainment brigade HR branch plans, coordinates, integrates, and manages HR support within the sustainment brigade's specified area of operations.

7-10. HR capabilities include personnel accounting, R5 operations, casualty operations, postal operations, and HR operations and staff planning. Each of these capabilities must be fully integrated and synchronized with all other facets of the sustainment function in order to effectively and efficiently sustain units in or passing through the sustainment brigade's specified area of operations. For more detailed information on human resources support see FM 1-0, FMI 1-0.02 and FMI 4-93.2.

Financial Management Support

7-11. Financial management support to ADA units is provided by TSC sustainment brigades that provide support on an area basis within their specified area of operations. A financial management center (FMC) that functions as a staff element of the TSC provides technical oversight of financial management and resource management operations.

7-12. Subordinate financial management company and detachment capabilities include providing timely payment for contractor and vendor services support, disbursing and funding support, enemy prisoner of war pay support, non-U.S. pay support, and limited U.S. pay support. The financial management company also

provides a limited resource management capability to conduct analyses of tasks and priorities as they relate to financial and manpower requirements execution (see FM 1-06 and FMI 4-93.2).

LOGISTICS

7-13. Logistic support to ADA units beyond organic capabilities is ultimately provided by the TSC and its subordinate organizations.

THEATER SUSTAINMENT COMMAND

7-14. Within a theater, theater of operations, or joint operations area (JOA), the TSC is responsible for synchronizing, integrating, and otherwise conducting sustainment operations (less health service support) in support of brigade-centric Army forces conducting full spectrum operations (see FM 4-93.4).

7-15. The TSC is responsible for planning, controlling, and synchronizing Army deployment and sustainment for the Army Service Component Command (ASCC) or a joint force commander (JFC). It is capable of simultaneously supporting deployment, movement, sustainment, reconstitution, and retrograde operations.

7-16. The TSC executes its assigned missions through the use of modular forces, to include expeditionary sustainment commands (ESC), sustainment brigades, combat sustainment support battalions, and other modular sustainment formations. Sustainment brigades, combat sustainment support battalions, and functional sustainment units serve as the building blocks of the force structure designed to execute TSC missions within a theater, theater of operations, or JOA.

7-17. The TSC is the distribution manager of the intratheater segment of the global distribution system. It executes distribution operations in accordance with priorities promulgated by the ASCC G-4. If an ESC is deployed, it performs the role of distribution manager for its specified theater of operations or JOA. The ESC and sustainment brigades monitor, track, and execute distribution operations in accordance with TSC guidance.

7-18. A financial management center (FMC) and a human resources sustainment center (HRSC) collocate with the TSC and function as staff elements of the TSC. The FMC provides technical oversight of all Army financial management operations in the theater. The HRSC provides theater-level support to the ASCC G-1 and enables the TSC commander to plan, integrate and execute human resources support to the theater. The HRSC integrates and ensures execution of human resources support throughout the theater as defined by the policies and priorities established by the ASCC G-1 in postal; casualty; reception, replacement, rest and recuperation, return to duty, and redeployment (R5); and personnel accounting and strength reporting (PASR) core competencies.

SUSTAINMENT BRIGADE

7-19. ADA commanders and staffs should coordinate closely with the sustainment brigade support operations officer to communicate logistics requirements and priorities.

7-20. The sustainment brigade, attached to an ESC/TSC, provides command and control for all subordinate units, and provides sustainment in an area of operations as defined by the ESC/TSC. The sustainment brigade plans and executes sustainment, distribution, theater opening and reception, staging, and onward movement of Army forces in full spectrum operations as directed by the ESC/TSC, providing support on an area basis. Sustainment brigades are assigned multifunctional combat sustainment support battalions, functional logistics battalions, and modular logistics companies tailored and task organized to their specific mission.

7-21. The sustainment brigade provides support to wide array of units; a brigade combat team, support brigades, and elements of other services or nations as directed. ADA units operating within one of these footprints can expect to receive logistics support from the sustainment brigade unless otherwise coordinated.

COMBAT SUSTAINMENT SUPPORT BATTALION (CSSB)

7-22. The CSSB will be a key organization in providing logistics support to ADA units. As a subordinate element of the sustainment brigade, its operations will be directed by the sustainment brigade support operations officer. It will usually be the prime source of all support beyond ADA organic capabilities. It is important that ADA commanders and staff understand the composition of the CSSB from which they expect to receive support. This ensures a full understanding of the support available and allows commanders to accurately communicate support requirements.

7-23. The CSSB is a tailored, multifunctional logistics organization. It is a flexible and responsive team that executes logistics throughout the depth of their assigned AO. The CSSB subordinate elements may consist of functional companies providing supplies, ammunition, fuel, water, transportation, cargo transfer, mortuary affairs, maintenance, field services, and human resources management. This framework enables the employment of a tailored logistics unit capable of adapting quickly to changing tactical conditions. The CSSB works through the sustainment brigade in concert with the TSC for logistics operations to effectively support the maneuver commander.

7-24. Supported units are reliant upon CSSBs to meet replenishment requirements beyond their internal capabilities. The CSSB is the entity of the sustainment brigade that provides the distribution link between theater base and the supported units. Its function is to maintain the flow of replenishment; to retrograde unserviceable components, end items, and supplies; to monitor the distribution of replenishment that is throughput directly from the theater base by assets of the sustainment brigade tasked with providing theater distribution; and to assist with coordination and delivery if necessary. The CSSB augments/supplements supported units during the normal replenishment cycle, delivering supplies that are not being throughput directly to units.

BRIGADE SUPPORT BATTALION (BSB)

7-25. BSBs are organic to brigade combat teams (BCT) and all support brigades, except for the battlefield surveillance brigade. The battlefield surveillance brigade is supported by a brigade support company. BSB capabilities are tailored to the specific type of brigade they support. For example, the BSB of a heavy BCT has more fuel distribution and maintenance capabilities than a fires brigade. BSB capabilities include supply, maintenance, motor transport, but only BCTs contain Role II medical support capability. BSBs plan, coordinate, synchronize, and execute logistic operations in support of brigade operations.

7-26. Although the BSB operates in direct support of a BCT, it may be the source of logistics and medical support for ADA units operating within the BCT area when properly coordinated.

7-27. Functional support brigades, such as ADA brigades, do not have a BSB in their structure. As a result, they do not possess the same degree of self-sustaining operational endurance as a BCT or functional support brigade.

OPERATIONAL CONTRACT SUPPORT

7-28. Operational contract support provides additional sources of support for required supplies and services. Because of the cost of repair, complexity, system uniqueness, and maintenance capabilities many ADA systems are and will continue to be supported using operational contract support. Currently, there are three broad categories of contracted support: theater support, external support, and system support.

- Theater Support. Theater support contracts are prearranged contracts, or contracts awarded from the mission area, by contracting officers under the C2 of the contracting support brigade (CSB). Theater-support contracts are utilized to acquire goods, services, and minor construction support, usually from local commercial sources, to meet the immediate needs of operational commanders.
- External Support. External support contracts provide a variety of support to deployed forces. External support contracts may be prearranged contracts or contracts awarded during the contingency itself to support the mission and may include a mix of U.S. citizens, third country nationals, and local national subcontractor employees. The largest and most commonly used external support contract is the logistics civilian augmentation program (LOGCAP).

- System Support. System support contracts are pre-arranged contracts by the USAMC life cycle management commands (LCMC) and separate Assistant Secretary of the Army (Acquisition, life cycle Logistics, and Technology) program executive and product/project management offices. System contractors, made up mostly of U.S. citizens, provide support in garrison and may deploy with the force to both training and real-world operations. They may provide either temporary support during the initial fielding of a system, called interim contracted support, or long-term support for selected materiel systems, often referred to as contractor logistic support.

7-29. In many instances, the TSC will be the requiring activity (the unit requesting the support) for theater level and external support. The Army field support brigade (AFSB) has the lead for planning and coordinating system support contract actions. To gain an understanding of system support or contracting and contractor management see FMI 4-93.41 and FMI 4-93.42.

7-30. ADA units requiring contracted support are responsible for development of performance work statements, independent government cost estimate, and all other required documents as described in regulations or doctrine. The unit is also responsible for providing a contracting officer representative for contract oversight.

> **Note:** General engineering support is typically provided by an engineer brigade providing theater-level engineer support. In such cases, engineering support is usually provided on an area basis. Requirements for general engineering support are coordinated by the ADA brigade S-4.

HEALTH SERVICE SUPPORT

7-31. The Medical Command (Deployment Support) is the senior medical command within a theater. It is responsible for providing the requisite C2 necessary to deliver timely and responsive health service support in support of deployed forces. Subordinate organizations include medical brigades, multifunctional medical battalions, and other medical augmentation required by supported units. Command capabilities include the provisioning of combat health support, medical logistics, evacuation, and humanitarian services.

7-32. A medical logistics management center (MLMC) support team, a subordinate unit of the medical command, collocates with the TSC in order to facilitate the integrated and synchronized flow of Class VIII materiel throughout the theater, theater of operations, or JOA.

7-33. Health service support to ADA units beyond organic capability is provided by a medical brigade (MED BDE) multifunctional medical battalion (MMB) providing Role II care and medical logistics support on an area basis within their specified area of operations. Role II care includes immediate lifesaving measures, advanced trauma management, disease prevention, combat operational stress control prevention, casualty collection, evacuation from supported units to supporting medical treatment, dental, laboratory, x-ray, and a patient-holding capability.

ADA BRIGADE AND BATTALION ROLES IN SUSTAINMENT

7-34. Inherent in the conduct of air and missile defense (AMD) operations is the requirement for responsive and agile support. Although ADA units depend upon external support to sustain operations, sustainment begins at the unit level. For the most part, sustainment functions performed within ADA organizations are the responsibility of brigade and battalion S-1s and S-4s for staff oversight. Collectively, they are responsible for planning, coordinating, and monitoring the integration and synchronization of sustainment with the commander's battle rhythm. For the most part, the difference in staff roles between the brigade and battalion levels is scale and scope. The following listings highlight the core competencies of the S-1 and S-4 staff sections.

BRIGADE AND BATTALION S-1.

7-35. The core competencies of the brigade and battalion S-1 are as follows:
- HR planning and staff operations.
- Personnel readiness management (PRM).

- Personnel accountability and strength reporting (PASR).
- Personnel information management (PIM).
- Casualty operations.
- R5 operations.
- Postal operations.
- Essential personnel services (EPS) (Awards & Decorations, Evaluations, Leave/Passes, Promotions, Military Pay, etc.).
- Morale, welfare & recreation (MWR) operations.

BRIGADE AND BATTALION S-4.

7-36. The core competencies of the brigade and battalion S-4 are as follows:
- Logistics planning and staff operations.
- Supply.
- Maintenance.
- Transportation.
- Services.
- Food Service.
- Construction Support.

ROLE I-MEDICAL CARE

7-37. ADA battalions also have an organic Role I medical care capability. At this level, capabilities include combat lifesavers, combat medics, and a battalion aid station. The care provided includes immediate lifesaving measures, advanced trauma management, disease prevention, combat operational stress control prevention, casualty collection, and evacuation from supported units to supporting medical treatment.

MAINTENANCE

7-38. Additionally, ADA battalions and separate batteries have organic maintenance capability in both repair operations and maintenance management. These maintenance elements provide field level maintenance support to all organic units including automotive, ground support equipment, communications-electronic and missile peculiar systems. They also maintain an authorized stockage list of repair parts to support maintenance operations. (For more information on the ADA maintenance unit capabilities, see FM 4-30.3). Sustainment level maintenance is performed by a component repair company operating in the theater.

Appendix A

Intelligence Preparation of the Battlefield

This appendix describes the IPB process as it applies to AMD operations. With the current lack of a single well-defined threat to plan against, the IPB process will provide continuous input toward defining that threat. Developing templates will be more challenging and more critical in support of the IPB process.

PROCESS

A-1. FM 34-130 explains the IPB process in detail. The commander uses IPB to understand the operational environment and the options it presents to friendly and enemy forces. IPB is a systematic, continuous process of analyzing the threat and environment in a specific area. By applying the IPB process, the commander gains the information necessary to selectively apply and maximize combat power at critical points in time and space on the battlefield. Airspace, or the aerial dimension, is the most dynamic and fast paced of the four operational dimensions. The intelligence staff must consider all the aspects of air operations and must be aware of the capabilities of all air threats, to include UASs, ballistic missiles, cruise missiles, ASMs, and rotary- and fixed-wing aircraft. The G-2 and S-2 have overall staff responsibility for IPB. ADA and aviation officers must provide input to the G-2 and S-2 when integrating air aspects into the IPB process.

A-2. The IPB process has the following four steps:
- Define the operational environment.
- Describe the operational environments' effects.
- Evaluate the threat.
- Determine threat courses of action.

A-3. Since terrain, weather, and other characteristics of the operational environment have different effects on air operations and AMD operations, aerial IPB differs from ground IPB. Threat forces must be evaluated in relation to the effects that weather, terrain, and friendly operations will have on them. The most significant threats that must be evaluated for aerial IPB are UASs, ballistic missiles, cruise missiles, and fixed- and rotary-wing aircraft. Aerial IPB is an integral part of the IPB process at all levels.

DEFINE THE OPERATIONAL ENVIRONMENT

A-4. The operational environment includes aerial dimensions in an area of operations, and an area of interest. Because of the aerial dimension, each of these parts of the operational environment framework may be different from that of ground force operations.

AREA OF OPERATIONS

A-5. The air area of operations is the area where the commander is assigned responsibility and authority for military operations. It usually is, but does not necessarily need to be, identical to the ground area of operations in width and depth. It extends vertically up to the maximum altitude of friendly ADA systems.

OPERATIONAL ENVIRONMENT

A-6. Operational environment is a physical volume that expands or contracts in relation to the ability to acquire and engage the threat. It varies in width, depth, and height as the commander positions and moves assets over time. Operational environment is not assigned by a higher commander and can extend beyond the commander's area of operations.

AREA OF INTEREST

A-7. The area of interest is the geographic area and the airspace above it from which information and intelligence are required to facilitate planning or successful conduct of the commander's operation. The ADA commander's area of interest is generally larger than the area of operations or operational environment due to the great distances that enemy air and missile systems can rapidly cover. The air area of interest will extend vertically to cover the maximum service ceilings or trajectories of aircraft, UASs, and missile systems. Horizontally, it will extend to cover the maximum range of aircraft, UASs, and missiles, enemy airfields, forward arming and refueling points, navigation aids, and missile sites. The area of interest extends to the limits from which intelligence and information must be gathered about enemy forces that could affect friendly forces.

DESCRIBE THE OPERATIONAL ENVIRONMENT'S EFFECTS

A-8. The effects of terrain and weather on the enemy and friendly forces must be analyzed. They are different than the effects on ground operations.

TERRAIN ANALYSIS

A-9. Terrain analysis in support of air and missile defense is significantly different from terrain analysis for ground operations. The nature of airspace does not eliminate the need for terrain analysis because enemy air and friendly AD will still attempt to use terrain to their own best advantage. IPB focuses on the impact of geographic factors on the ability of enemy air to approach, acquire, and engage a target, or deliver airborne or air assault troops. Analysis of the terrain for air and missile defense follows the same principles as ground analysis and uses the military aspects of terrain: observation and fields of fire, avenues of approach, key terrain, obstacles, and cover and concealment (OAKOC).

OBSERVATION AND FIELDS OF FIRE

A-10. These aspects relate to the influence of terrain on reconnaissance and target acquisition. In the IPB context, observation relates to optical and electronic line of sight. Many battlefield systems require line of sight to effectively operate or acquire and engage targets. These systems include radios, radar, jamming systems, direct-fire weapons, and airborne and ground sensors as well as friendly ADA systems. Fields of fire relate to the terrain effects on weapon systems. Airspace must be analyzed with regard to routes that provide the best protection for air threats entering the target area, and those that provide the best fields of fire once they reach the target area.

AIR AVENUES OF APPROACH

A-11. Air avenues of approach are evaluated using the same criteria as for ground. A good air avenue of approach will permit maneuver while providing terrain masking from surface-to-air weapon systems. Some common air avenues of approach are valleys, direct lines from the threat point of origin, and riverbeds. Factors that should be used to determine entry and exit air avenues of approach are as follows:

- Type of air threat, attack profile, and ordnance.
- Air threat point of origin and ground control radar positions.
- Probable threat objective.
- Potential to support maneuver forces.
- Freedom to maneuver within the air avenue.
- Protection afforded to the air system and pilot.
- Air threat and pilot capabilities.

A-12. **Type of Air Threat.** UASs are small and elusive. Although they usually fly at low altitudes, their altitude can vary. Once in the target area, they may fly an orbit attempting to stay out of engagement range of ADA. Most surfaced-launched cruise missiles are terrain following, and they use terrain masking. Due to their range, they may take indirect approach routes. Ballistic missiles are not terrain dependent. They fly a straight ground track from launch point to objective. Their flight is not restricted by terrain. ASMs usually

fly direct routes from launch platform to the target. Rotary-wing aircraft primarily conduct contour flights. They follow ridgelines and military crests, using the terrain to mask their approach to the target area. Fixed-wing aircraft usually follow major terrain or man-made features. Depending on range, they may fly a straight line to the target. Ordnance or payload may affect range and altitude of the air system and thus influence the selection of avenues of approach.

A-13. **Point of Origin.** Staff looks at the commander's entire area of interest when determining air avenues. Analysis begins at the enemy airfield, UAS, or missile launch site and works toward the probable enemy objective. This allows a look at the big picture. The staff considers the range of the air systems and location of navigation aids and ground control sites.

A-14. **Probable Enemy Objective.** Each avenue of approach must end at a target, drop zone, landing zone, or within reconnaissance, intelligence, surveillance, or target acquisition range of a target. Reverse IPB is used to pick enemy objectives. These objectives may be used to determine critical maneuver force assets that require AMD protection. Air assets that are used to achieve ground objectives will seek to use air avenues of approach coincident with ground avenues of approach. Air assets attacking deep are not limited to these ground avenues. Ground corridors do not limit missiles and ISR UASs.

A-15. The following questions should be used to evaluate the avenue's freedom to maneuver:
- Canalize the air system?
- Have access to adjacent avenues?
- Provide the ability to acquire a target and use available munitions?
- Assist in navigation?

A-16. The following questions should be used to evaluate the avenue's protection for the system and pilot:
- Provide terrain masking (cover and concealment)?
- Provide for full use of air system speed?
- Provide protection against radar detection?
- Provide protection from air and missile defense weapon systems and tactical air support?
- Provide a standoff orbit location?
- Provide a standoff orbit?

A-17. The following questions should be used to evaluate the air threat and pilot capabilities. Can the air system or pilot:
- Perform contour flying?
- Fly at night?
- Fly in all weather conditions?
- Range the targets?

OBSTACLES

A-18. Obstacles are broken down into the following three primary types:
- Those that prevent the effective employment of ADA systems.
- Those that restrict contour flight.
- Those that force air threats to employ a particular surveillance or attack profile, route, or to gain excessive altitude.

A-19. Of particular interest are obstacles and terrain, which restrict lateral movement within an avenue of approach. This will canalize movement or restrict evasive action. Additionally, terrain may stop the employment of certain air threat systems if the terrain exceeds the system's maximum operating ceiling. Obstacles should be plotted on a modified combined obstacles overlay.

KEY TERRAIN

A-20. Key terrain is any locality or area in which the seizure, retention, or control of it will afford a marked advantage to either combatant. In the aerial dimension, these consist of terrain features that canalize or

constrain air threat systems and terrain with an elevation higher than the maximum ceiling of air threat systems. Additionally, areas that can be used for airfields, landing and drop zones, or forward arming and refueling points also need to be considered as key terrain (since these areas could be used to support friendly or enemy air operations). Terrain can be used as an aid to navigation. Man-made features are also used as cues to navigate to targets.

COVER AND CONCEALMENT

A-21. Cover and concealment have slightly different applications with respect to air systems. The following tactics and techniques fall into the context of cover and concealment:

- **Contour flight.** Flight at low altitude conforming generally to, and in proximity to, the contours of the earth. It is characterized by varying airspeeds and altitudes as dictated by vegetation, obstacles, and ambient light. Generally speaking, contour is defined as operating with the skids or wheels between 25 and 80 feet above the highest obstacle.
- **Pop-up tactics.** Low-level approach to the target area used by high-speed fixed wing aircraft such as the F-16. Target acquisition and engagement is made by popping up in altitude at a predetermined position or time to minimize exposure.
- **Masking.** Masking is the use of terrain to hide an aircraft from visual and electronic observation or detection. Electronic warfare is used to supplement natural terrain masking.
- **Cover.** Protection from direct-fire weapon systems utilizes solid terrain.
- **Ground clutter.** Characterized as a reduction of electromagnetic signal-to-noise ratio due to the signature of a background. It is different for each type of terrain or feature.

A-22. Fixed and rotary wing aircraft, cruise missiles, and possibly even UASs will use contour flying, masking and ground clutter to avoid detection and to provide cover from direct fires. Aircraft will also use the terrain by loitering on reverse slopes, using pop-up tactics, and by using ground clutter and vegetation as a backdrop to enhance concealment.

WEATHER ANALYSIS

A-23. Air operations are especially susceptible to the effects of weather. Weather analysis for air and missile defense operations is designed to predict the most likely time over target and other considerations based on weather effects and light data.

A-24. Many of the same factors the G-2 or S-2 considers for ground operations are as follows:

- Visibility has a significant impact on offensive air operations and ISR. Visibility has the same effects on visually directed ADA systems and sensors.
- High winds will hinder maneuver, close air support, and target engagement, especially in tight air avenues of approach. Missiles and UASs will be adversely affected in performance and accuracy.
- Precipitation affects aircraft, missile, and UAS performance and reduces the effectiveness of sensors. Precipitation reduces ADA sensor range.
- Cloud cover and ceilings may restrict operations by setting low operational ceilings and restricting visibility and target engagement.
- Low ceilings, overcast, and clouds may restrict visually directed ADA weapons' detection and acquisition ranges.
- Extreme temperature and humidity have a severe effect on aircraft and UASs by decreasing combat range, altitude (particularly rotary-wing aircraft) and ordnance loads.

EVALUATE THE THREAT

A-25. Threat evaluation for air operations consists of a detailed study of enemy air capabilities, organization, and doctrine. The following steps should be used when evaluating the threat:

- Collect and analyze doctrinal threat data.
- Analyze enemy air capabilities.

● Conduct target evaluation.

COLLECT AND ANALYZE DOCTRINAL THREAT DATA

A-26. Typical questions that should be answered during this step must also include the commander's intent, guidance, critical information requirements and priority intelligence requirements. They are as follows:

● What are the major strategic, operational, and tactical objectives of the enemy's air operations?

● Which objectives may be targeted for destruction or suppression?

● Where are previously reported missile launch positions? What are the likely targets? What are the range, endurance, and profile of these systems?

● What is the size of the ballistic missile brigade, battalion, and battery? Does it fire as a unit? Does the enemy have mobile, fixed, or both types of launchers?

● Where do friendly air and missile defense assets fit into the enemy's objectives? Do they need to be destroyed or suppressed for the enemy plan to work? (Answers to these two questions may result in modification to air avenues of approach.)

● What is the enemy's air order of battle? How are the assets organized? (Knowledge of enemy organization, and who has operational control, will indicate the importance of the area of operations. For example, if the enemy's bombers are at theater level and are in the area of operations, then that area is probably receiving the theater's main attack.)

● Who has tactical control of aircraft at the point of attack?

● How will UASs be used, for example, battle damage assessment, attack, or ISR? What are the associated profiles?

● How does the enemy doctrinally attack? Will the enemy use airborne, air assault or special operations forces in conjunction with an air or ground attack? What sizes are these forces and to what depth are they used? Will the enemy synchronize the air attack? Does the enemy have the capability to coordinate an air attack (possibly with varied air threat platforms that can overmatch friendly air and missile defense capability)?

● What are air system combat ingress and egress speeds?

● What are the doctrinal distances for forward arming and refueling points? If the enemy's maximum range falls short of the area of operations, where is the enemy likely to stop and refuel or be aerial refueled?

● How and where will the enemy attack ground targets for interdiction?

● At what altitude will the enemy approach the target, deliver munitions, and exit the target area?

● What is the release authority of certain types of ordnance? (This is particularly important when dealing with CBRNE threats.)

● How does the enemy employ reconnaissance assets?

● How has the enemy historically fought?

● Was asymmetrical threat operations considered?

ANALYZE ENEMY AIR CAPABILITIES

A-27. ADA units evaluate a broad range of order-of-battle data and enemy capabilities to include the ground force and EW threat to ADA units. They also evaluate the answers to the following questions concerning threat systems.

Ballistic Missiles

A-28. The following questions should be asked concerning the capabilities of threat ballistic missile systems:

● Performances (missile flight time, speed, trajectory, and launch restrictions)?

● Location of surveyed launch sites?

● Maximum and minimum ranges?

● Circular error probable?

- Crew proficiency?
- Reload and fire time? What is the number of ballistic missiles available per TEL?
- Warhead type and size?
- Guidance modes?
- Sub-munitions release altitude?

Cruise missiles

A-29. The following questions should be asked concerning the capabilities of threat cruise missiles:
- Performances (duration of flight, speed, altitude, and launch restrictions)?
- Maximum and minimum ranges?
- Circular error probable?
- Targeting capabilities and type?
- Contour flying capability?
- Vulnerability to countermeasures?
- Guidance modes?
- Warhead type and size?

Aircraft

A-30. The following questions should be asked concerning the capabilities of air systems:
- The enemy's capability to coordinate air-to-ground attacks?
- The enemy's capability to coordinate air and artillery operations? Are ground forward air controllers used?
- The enemy's capabilities for suppression of friendly air and missile defense?
- Performance (speed, altitude, airfield restrictions, troop and weapon load capacity)?
- Endurance and range (ingress and egress altitudes and speeds)?
- Levels of combat readiness and sortie generation rate?
- Ability to conduct pop-up maneuvers? What is the standoff range?
- Target acquisition capability, night and adverse-weather capability, and identification ranges?
- The standoff ranges for cruise and tactical air-to-surface missiles?
- Ordnance load (maximum weight, type, load mixture, and level of sophistication)?
- Navigational capability (type of radar; can it fly at night or in adverse conditions)?
- Combat radius (with or without external tanks, ordnance, and location of staging bases)?
- Loiter time (how long will it have on station over the target area)?
- Countermeasures environment? For example, will standoff jammers, ground-based jammers, reconnaissance or chaff-laying UASs, or aircraft degrade friendly air defense artillery systems?
- How much do they conform to doctrine?
- Ability of pilots to fly at night or perform contour flying? During peacetime did the pilot train on wartime type missions?
- Types and capabilities of threat ordnance? Each type of ordnance also should be evaluated for the following:
    - Range (assume engagement at maximum range and two-thirds maximum range)?
    - Accuracy?
    - Release altitude (how high or low must the aircraft fly)?
    - Reload and fire time. What is the number of missiles available?
    - Warhead type (for example, mass casualty, conventional, and sub-munitions)?
    - What is the release altitude?
    - Guidance modes (how does the pilot acquire and engage)?

Unmanned aircraft systems

A-31. The following questions should be asked concerning the capabilities of threat UASs:

- Performances (speed, altitude, and launch restrictions)?
- Endurance and range?
- Contour flying or terrain limiting factors?
- Target acquisition and standoff range?
- Sensor package and payload (maximum weight, type, and load mixture)?
- Loiter time (how long can the UAS stay on station)?
- Visibility effects on acquisition?
- Modes of recovery and turnaround time?
- Real-time, data-link capability?
- Guidance modes (ground controlled and preprogrammed)?
- Crew proficiency?

CONDUCT TARGET VALUE EVALUATION

A-32. This should determine what targets are to be labeled as high-value targets. High-value targets are assets the enemy or friendly commander has deemed as important for the successful accomplishment of the mission. High-value targets are determined by operational necessity and weapon system capability.

DETERMINE THREAT COURSES OF ACTION

A-33. Determining both the enemy air and ground courses of action integrates the results of the previous three steps into a meaningful conclusion. Given what enemy air and missile forces prefer to do, and the effects of the operational environment, what are the enemy's likely objectives and what COA is available to him? The G-2 or S-2 develops threat models that depict the enemy's air and missile COA. They also prepare event templates and matrices that focus intelligence collection on identifying which COA the enemy will execute. The process of developing these templates and matrices is covered in depth in FM 34-130. The decision support template is an integrated staff product that results from the war-gaming of potential friendly courses of action (FM 34-130).

SITUATION TEMPLATE

A-34. A situation template is a graphic depiction of expected enemy dispositions should they adopt a particular COA. They usually depict the most critical point in the operation as agreed upon by the G-2 and G-3. However, the G-2 or S-2 might prepare several templates representing different snapshots in time starting with the initial threat array. The situation template integrates air attack and surveillance profiles with terrain. It focuses on specific air avenues of approach and mobility corridors to determine which avenues are the most capable of supporting specific attack techniques, profiles, and the most direct routes to landing and drop zones to protect and ensure the survivability of air threat systems (FM 34-130).

EVENT TEMPLATE

A-35. An event template is a guide for collection and reconnaissance and surveillance (R&S) planning. It depicts named areas of interest (NAI) where the commander expects to see certain activities of tactical significance and is used to confirm or deny an enemy course of action. These NAI are based on the terrain constraints on air approach routes to potential targets and analysis of the enemy's attack and ISR profiles. The G-2 or S-2 develops an event matrix to support the event template by providing details on the type of activity expected in each NAI, the times the NAI is expected to be active, and its relationship to other events on the battlefield. Examples of NAI include landing and drop zones, forward arming and refueling points, forward staging areas, and previous BM launch locations (FM 34-130).

DECISION SUPPORT TEMPLATE

A-36. A decision support template is based on the situation and event templates, event matrix, and the war gaming of friendly COA results. A decision support template should depict the following–

- Air avenues of approach.
- Airborne and air assault objectives.
- Landing and drop zones and largest size enemy element that could be employed at the zone.
- Range of threat systems.
- Range of friendly air and missile defense systems.
- Target areas of interest (TAI).
- Decision points (DP).

A-37. Air TAI and DP are determined in the same manner as for ground operations. However, due to the high speeds of air systems, decision points must be placed significantly farther in advance of the TAI.

APPLYING IPB

A-38. IPB is a systematic, continuous process of analyzing the threat and environment in a specific geographic setting. Applying the IPB process helps the commander apply and maximize combat power at critical points in time and space by determining the enemy's likely COA and describing the environment and its effects on operations. Preparation and continuous updates of the aerial portion of IPB are fundamental to the execution of the air and missile defense and land force missions on the modern battlefield.

Appendix B

Threat

This appendix summarizes the air and missile threats facing Army ADA forces and systems. The summaries are generic threat capability descriptions of near-term threats (through 2010). The air and missile threats to be countered by Army ADA systems include theater missiles (ballistic, cruise, and air-to-surface), unmanned aircraft systems, unmanned combat aerial vehicles, fixed-wing aircraft, rotary-wing aircraft, and large caliber rockets. The employment of WMD in missile warheads and use of unmanned platforms are the asymmetric methods of aggression of primary concern to Army ADA forces. The threat environment (threats to our systems/forces) is also described.

OVERVIEW

B-1. The evolving theater air and missile threat will take on new, stressing characteristics in the 21st century Figure B-1. The major threat to deployed U.S. forces in 2010 will continue to be that of regional powers as they seek to dominate their respective regions. Adversaries will continue to closely observe emerging U.S. capabilities in an effort to identify and exploit weaknesses using asymmetric approaches. Chemical, biological, Radiological, nuclear weapons proliferation—and their delivery means (particularly ballistic and cruise missiles), stealth capabilities, and the employment of unmanned aircraft systems (UAS) will improve their military forces and the asymmetric options available to them when facing the U.S. and its allies and coalition partners.

B-2. Fundamental capabilities that 21st century adversaries may pursue to counter U.S. strengths include, but are not limited to, weapons of mass destruction (WMD), unmanned reconnaissance, surveillance and target acquisition (ISR) platforms, UAS, large numbers of inexpensive rockets, low-observable cruise missiles, and information warfare. Some states may rely on asymmetric capabilities as a substitute for, or complement to, large conventional forces. Regional competition reinforces the perceived need to acquire unmanned systems that provide high operational effectiveness for nominal cost.

B-3. Transformation planning must start with the evaluation of the global threat environment. Knowledge of this environment enables AMD planners to focus resources on countering the threat. The following perceptions of combat operations widely held within the U.S. and abroad, have been filtered through the lens of Desert Storm, Bosnia and Kosovo. These perceptions, however, do not represent future military reality. The U.S. conducts deliberate actions and dictates the tempo of these actions. U.S. systems and technology are so advanced that opponents are virtually helpless to respond or retaliate by traditional means.

B-4. Close combat operations (except for WWII, Korea and Vietnam) are based on low casualties, a secure homeland, precision attacks and a relatively short duration of conflict. U.S. military forces have a significant advantage in almost every measurable area.

THE STRATEGIC LANDSCAPE

B-5. The multi-polar nature of today's strategic environment is likely to continue at least for the next two decades. By 2015, regional powers will emerge on the global scene as both developed and developing states move into global networks of economic interest. This will create a strategic framework for friction as cultures, religions, governments, economies, and people collide in a highly competitive global market. Alliances and political alignments will change as nations within regions seek to form strategic partnerships in an increasingly global economy.

B-6.   The key powers in a regional and global context will most likely be the United States, the European Union, China, Japan, and Russia. Future alliances, coalitions, and partnerships will most likely be made with these nations. Key regional powers with the greatest potential for creating global consequences are most likely Indonesia, India, Iran, Pakistan, Turkey, Egypt, South Africa, Brazil, Algeria and Mexico. The implication is not that these nations represent the most powerful in a given region, but that certain countries/regions have assumed a growing significance in the global setting.

B-7.   Of the 192 Nation-States in the world today, as many as 30 have the potential to fail because they cannot meet the needs of their populations, or because of ethnic, cultural or religious friction. Failure of a state(s) will cause instability in a region and possibly have worldwide ramifications for the U.S. and its allies. It is probable that within the next ten years the Koreas will reunite by either peaceful of violent means. Such changes will affect world geopolitical and economic reality. There have been more than 50 ethnic wars, 170 border conflicts and 2 major wars involving extra regional forces in the past 10 years. Violence on a national, transnational and sub national level will continue.

B-8.   During the period from the present to 2015, The Army will operate in a geostrategic environment of considerable instability, driven by significant demographic, geopolitical, economic and technological dynamics. The realities of this environment will force the Army to remain engaged in a wide variety of missions. Despite this instability, it is quite possible the U.S. will enjoy a period of relative strategic calm in which no single conventional foreign power can threaten its survival. This is by no means a certainty, however, as regional alliances and reallocation of spending could quickly change military capabilities. What is certain is that numerous opponents will have the capability and the desire to challenge U.S. interests on a regional basis.

POTENTIAL CONFLICT

B-9.   State interests will determine the nature and scope of any future conflict. Adversaries will study how we fight and develop appropriate doctrine/capabilities to exploit perceived vulnerabilities in our force projection strategy. The potential for a high-intensity Major Theater of War will exist to 2015 and beyond, Major Regional Crises requiring combat operations are highly probable, and Small-Scale Contingencies will be a certainty. The Army must therefore be ready to fight across the full spectrum of conflict against any foe, regardless of the environment. The threat will strike in unconventional and unexpected ways. U.S. forces will have to deal with terrorists' attacks, sophisticated ambushes, and other complex variables of the operational environment.

Threat Tactics And Objectives

B-10. Most operations against the U.S. will be force oriented and focus on our universally perceived strategic center of gravity—mass casualties and the resultant on our national resolve.

Denying Entry

B-11. One of the prime objectives of future Threat forces is to prevent U.S. forces from gaining entry into the theater. The threat will want to establish a rapid tempo early on to achieve objectives and prevent U.S. from establishing a foothold in the region. The enemy will seek to interdict U.S. forces attempting to enter the conflict area using all means available. If the U.S. successfully gains entry, the enemy will seek battle in complex terrain and urban environments as a way of offsetting U.S. advantages, particularly its principle operating construct of standoff/long-range precision fires.

INTEGRATED INFORMATION AND DECEPTION PLANS

B-12. Threat forces will be capable of supporting camouflage and deception operations at all levels throughout all battlefield operating systems. Potential adversaries will consider deception operations imperative when fighting a U.S. force—they will try to convince U.S. commanders that conventional tactics are being used, thereby making them vulnerable to unconventional tactics. The enemy will be difficult to predict as it adapts and attempts to create opportunity. Coalitions, both friendly and adversarial, will be used to limit the nature of operations. Commercial, space based ISR systems will be used to support precision targeting and increased situational awareness. In many cases the threat could reduce "logistics

signature" by pre-positioning supplies. The threat will not see the use of chemical weapons as an escalation of the conflict.

AMBUSHES

B-13. Threat forces will also plan, prepare and execute sophisticated ambushes against U.S. forces moving toward defended areas. These ambushes will usually take place in complex terrain, where Threat forces can canalize advancing U.S. units into minefields. Once the U.S. force encounters the minefields, unmanned aerial vehicles (UASs) will be used to confirm U.S. force locations. Long range artillery rockets and standoff attack helicopters are the preferred attack means, ensuring U.S. casualties while avoiding force-on-force contact. Artillery rockets are ideal for delivering large quantities of WMD warheads, while attack helicopters are the fastest means of transporting standoff firepower around the battlefield. Multiple ambushes will be planned and executed, and the combination of UASs for constant target acquisition/battle damage assessment and the long range firepower of attack helicopters and artillery rockets pose significant risk to the U.S. force.

Threat Capabilities

B-14. In the future, most nations will continue to improve and maintain military capabilities in line with regional threats or opportunities. However, potential adversaries will also modernize their military capabilities based on lessons learned from late 20th-century conflicts, particularly those involving the U.S. Evidence exists that they will resort to a wide range of constantly modified, asymmetrically applied conventional and unconventional tactics and capabilities to oppose the U.S. on the battlefield and to interdict deployment of U.S. forces. Advances in information and missile technology (ballistic as well as cruise missiles), weapons of mass destruction, genetic engineering, and an increasingly competitive global economy will fuel continued military change. The proliferation of weapons of mass destruction (WMD) and long range delivery systems will enable adversaries to threaten each other at greater ranges, with greater accuracy and lethality.

21st Century Threat Capabilities

B-15. The evolving threat will take on new, more challenging characteristics in the 21st century. Adversaries will closely observe emerging U.S. capabilities in an effort to identify and exploit weaknesses using asymmetric approaches. An asymmetric approach uses simple counters to negate U.S. capabilities and avoid a direct match with U.S. strengths. Fundamental capabilities that 21st-century adversaries may pursue to counter U.S. strengths include weapons of mass destruction; intelligence, surveillance, and reconnaissance (ISR) via unmanned aircraft systems (UASs); precision strike technology; large caliber rockets; cruise missiles; and information warfare (see Figure B-1). Some countries will rely on asymmetric capabilities as a substitute for, or complement to, large conventional forces. Regional competition will reinforce the perceived need to acquire unmanned systems that provide high operational effectiveness at a nominal cost, as a substitute for manned aircraft. Emerging Technology Cyberspace and microelectronics are enhancing today's and tomorrow's capabilities. Potential adversaries can purchase technologically-advanced equipment that allows them to upgrade their capabilities and regional position quickly.

B-16. The best state-of-threat equipment in the world is routinely offered for sale at trade shows, via foreign military sales, and through the Internet. Everything is available on the Internet—from sophisticated cruise missiles, to TBM components, to satellite imagery. The microelectronics revolution has given potential adversaries numerous means of providing their lethal systems with real-time targeting data. Online commercially available satellite imagery, cable network news, and unmanned aerial platforms fill in many of the gaps in intelligence that previously degraded the threat targeting capability.
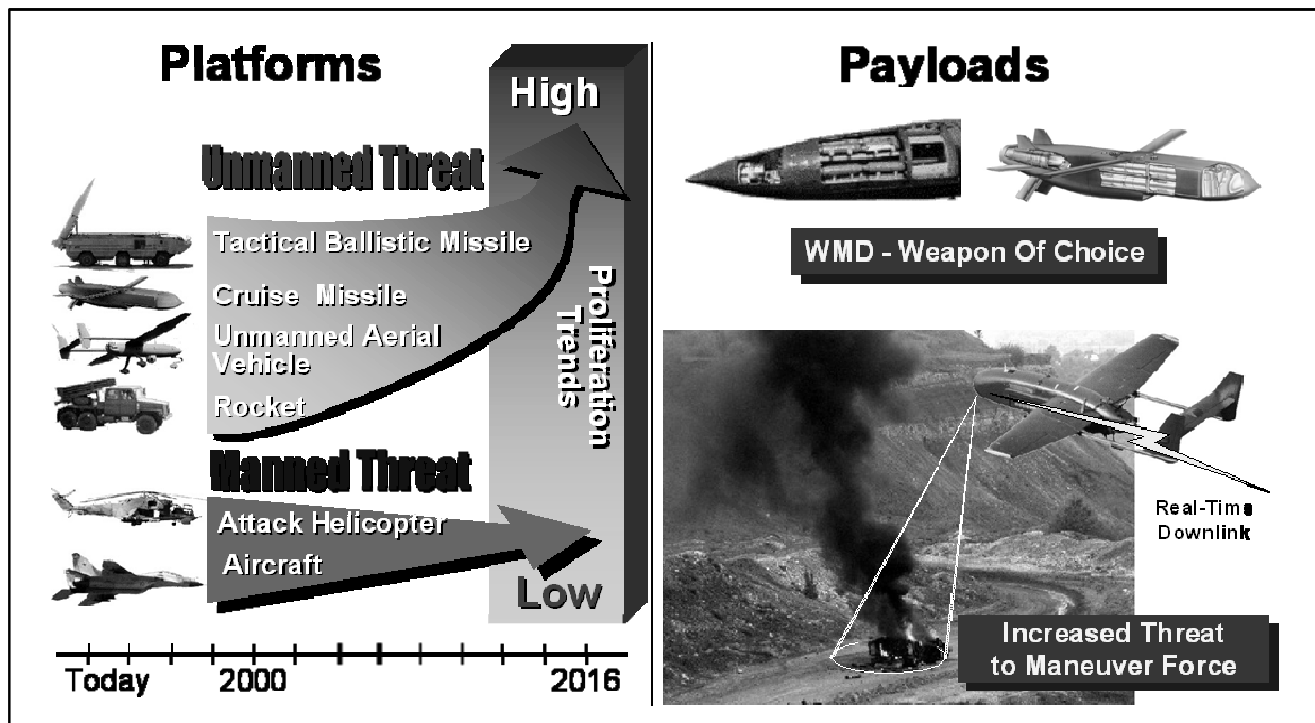
Figure B-1. Platforms and payloads

Theater Air And Missile Threat

B-17. The emerging air and missile threat is diverse and complex, encompassing a wide range of missiles, rockets, projectiles, and aerial platforms. The number of countries developing nuclear, chemical, and biological weapons is unconstrained, and delivery systems with increasing range and accuracy are proliferating. The air and missile threats discussed in this chapter are concise and unclassified. Additional classified information on producers, users and more specific characteristics and capabilities is available in the references provided at the end of each threat category (references will be incorporated at a later date).

Tactical Ballistic Missiles

B-18. TBMs include short-range ballistic missiles with ranges up to 1,000 kilometers and medium-range ballistic missiles with ranges from 1,000 to 3,000 kilometers. These are surface-launched missiles with ballistic trajectories. TBMs, often launched from highly mobile, difficult-to-detect transporter erector launchers, can carry nuclear, biological, and chemical weapons. Most TBMs are single-stage missiles with an estimated circular error probable accuracy of one-tenth of one percent of the range. State-of-the-art guidance technologies, such as the global positioning system and GLONASS, can increase this accuracy to less than 50 meters (Figure B-2).
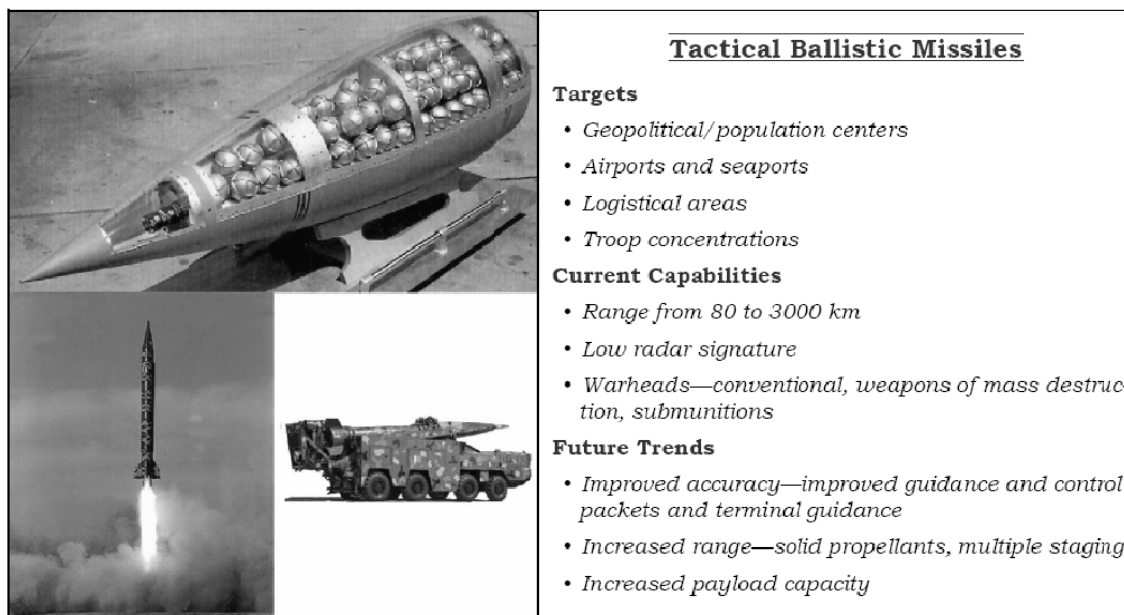
Figure B-2. Tactical ballistic missiles

What Makes TBMs Threatening?

B-19. TBMs are inherently difficult to defend against. Characteristics that increase TBM survivability include a small radar cross section, high terminal velocity, short notification time for defending forces, a variety of difficult-to-kill warheads, and an all-weather salvo launch capability.

Rockets, Artillery, And Mortars

B-20. Though rockets and artillery are organic to field artillery units and mortars to infantry units, they are grouped together because they exhibit similar characteristics and trends. They are expected to remain the most serious threat to personnel and to all but the most heavily protected vehicles and other equipment. Advances in munitions and delivery systems have increased their ranges and lethality. The advent of artillery-delivered, high precision munitions (ADHPM) makes the mounted and armored forces increasingly vulnerable to artillery indirect fire (Figure B-3).
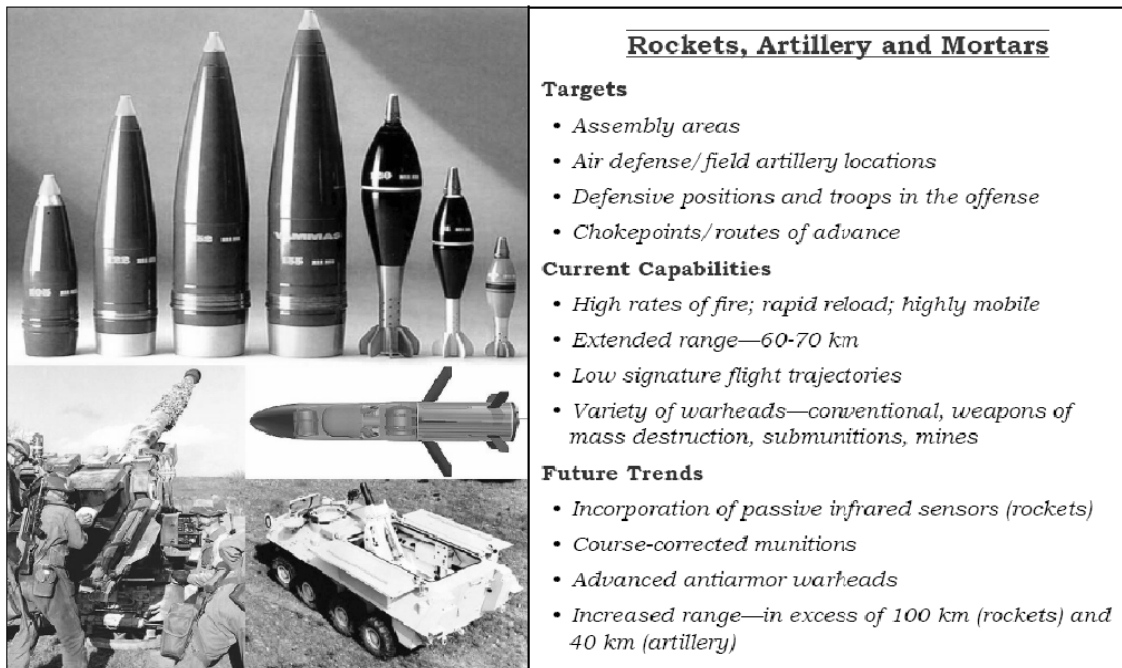
Figure B-3. Rockets, artillery, and mortars

Large-Caliber Rockets

B-21. Large-caliber rockets, classified as those of 200 millimeters and greater, are unguided, surface-launched, indirect fire rockets with minimum ranges of 50 kilometers and maximum ranges in excess of 100 kilometers. They can be fired from single or multiple launch platforms (Figure B-4).

Figure B-4. Large caliber rockets

B-22. Rockets can deliver high rates of fire and a variety of warheads, making them ideal weapon systems for fire support missions. The highly mobile launchers can rapidly move around the battlefield. This mobility, coupled with the rockets' short burn time, gives maneuver forces little warning. Their short range and salvo capability preclude engagement by current missile defense systems.

Cannon Artillery And Mortars

B-23. Artillery and mortars are recognized as systems of systems—each is not effective if one of its components (weapon, C2, reconnaissance, and munitions) is deficient. Thus, countries are upgrading and improving deficient components rather than replacing the entire systems.

What Makes Cannon Artillery And Mortars Threatening?

B-24. Cannon artillery and mortars possess high firepower and a variety of warheads. The advent of ADHPM represents a force multiplier, allowing smaller forces to rapidly and accurately attack larger mechanized forces.

Aerodynamic Missiles

B-25. Aerodynamic missiles include cruise missiles and tactical air-to-surface missiles. Though regarded as distinctly separate threats, the application of new technologies has given cruise missiles and tactical air-to-surface missiles virtually identical capabilities.

Cruise Missiles

B-26. Cruise missiles are unmanned, self-guided vehicles that maintain sustained flight at one or more predetermined constant (cruise) altitudes. These missiles carry a warhead or other lethal payload. There are two types of cruise missiles: anti-ship and land attack. The Army is most concerned with the land attack versions (Figure B-5).

Cruise Missiles

Targets
- *High-value military and industrial complexes*
- *Airports and seaports; logistical areas*
- *Command and control centers*
- *Armored/maneuver force concentrations*

Current Capabilities
- *Range from 30 to 3000 km; highly accurate*
- *360 degree threat; very low radar signature*
- *Air, sea or ground launched*
- *Warheads—conventional, weapons of mass destruction, submunitions.*

Future Trends
- *Increased number of land attack variants*
- *Reduced radar signatures*
- *Increased use of antiarmor submunitions*
- *Improved accuracy and increased range*

Figure B-5. Characteristics of cruise missiles

B-27. Cruise missiles are reliable, accurate, survivable, and lethal. They can be launched from the land, air, or sea; in flight, they are difficult to detect, can fly indirect routes at low altitudes to avoid heavily defended areas, and can attack from any direction. Today's cruise missile can hit a target with remarkable accuracy; tomorrow's smarter, maneuverable, more accurate missile will pose a far greater threat. Cruise missiles are ideal for striking high-value targets in highly defended areas, since aircraft and aircrews are not put at risk. Although only a few countries have operational land attack cruise missiles in their inventories today, Russia, France, Germany, Italy, Israel, South Africa, and China have ongoing development programs and are aggressive arms exporters. Many of the cruise missiles in development should become operational in the next five to ten years.

What Makes Cruise Missiles Threatening?

B-28. Emerging cruise missiles pose a serious threat because of their unique operational characteristics. New technologies used in airframe and warhead design and in propulsion and guidance systems increase their lethality. Stronger and lighter airframes made of composite materials give these missiles a lower radar cross section; also, low-observable and stealth technologies are now available to further reduce the radar cross section.

B-29. The use of air-breathing turbojet and turbofan engines has given cruise missiles a longer range, and the capability to fly at high, subsonic speeds and altitudes as low as 50 meters above ground level. Their flight paths can be programmed using sophisticated guidance systems such as the global positioning system, the inertial navigation system, and terrain contour matching; guidance systems contribute to overall accuracy, optimize surprise and help avoid air defenses. A terminal guidance seeker can increase accuracy to less than 10 meters. A wide array of conventional warheads, including individually targetable sub munitions, allows targeting of both soft and hard targets. Weapons of mass destruction pose the most

serious threat, but currently only Russia, France, and the United States have cruise missiles with nuclear warheads.

B-30. However, the development of a chemical or biological warhead is not difficult. The May 1997 Quadrennial Defense Review noted that the use of weapons of mass destruction is a likely condition of future warfare and that these weapons could be delivered by several means, including cruise missiles.

B-31. While land attack cruise missiles pose the greatest threat, submarine-launched cruise missiles are a potential threat to the United States in the foreseeable future. Some 19 countries currently produce cruise missiles, and several more have production capability. At least 54 others countries have some type of cruise missiles (mostly anti-ship) in their arsenals, and the trend toward land attack types is growing. A significant number of both land and anti-ship cruise missiles can be submarine launched, and at least three countries of concern (China, Iran, and North Korea) have submarines. Submarine-launched cruise missiles provide a viable asymmetrical attack option against U.S. ports and the U.S. homeland.

Tactical Air-To-Surface Missiles

B-32. These missiles are air-launched, precision-guided munitions designed to strike ground targets. They are ideal against targets that are difficult to destroy with conventional "dumb" bombs such as bridges. They are similar to air-launched cruise missiles, but are smaller, have shorter ranges, lack the wings and aerodynamic lifts associated with cruise missile flights, and are launched by tactical fighter-bomber aircraft. The former Soviet Union and Free World countries widely export tactical air-to-surface missiles, and the missiles are operational in numerous air forces around the world (Figure B-6).

Tactical Air-to-Surface Missiles

Targets
- *Armored vehicles*
- *Radars*
- *Bridges and "similar" point targets*
- *Air defense sites*

Current Capabilities
- *Range in excess of 100 km*
- *Supersonic speed (Mach 3)*
- *Extremely accurate*
- *Radio-command, laser, antiradiation homing, or electro-optical guidance*
- *Launch and leave or fire and forget*

Future Trends
- *Improved accuracy and lethality*
- *Lock-on-after-launch or loitering capability*
- *Dual mode seekers—increased reliability*

Figure B-6. Characteristics of tactical air-to-surface missiles

What Makes Tactical Air-To-Surface Missiles Threatening?

B-33. Tactical air-to-surface missiles are an extremely lethal threat because of their versatility and pinpoint accuracy. Most threat variants are of Soviet or Russian origin and employ radio-command, laser, antiradiation homing, or electro-optical guidance systems. Missiles that employ antiradiation homing systems are referred to as antiradiation missiles (ARMs); they represent the greatest threat to AMD, field artillery (counter-battery), aviation, and intelligence radars. Most have ranges of more than 100 kilometers. An aircraft firing an ARM will usually launch from outside the lethal envelope of the air defense system defending the asset. Laser-guided systems provide the least standoff protection because of their short range, generally less than 10 kilometers. Electro-optical or video-guided systems and ARMs offer the greatest

standoff range and aircraft survivability factor. Some electro-optical systems have ranges of approximately 100 kilometers.

Unmanned Aircraft Systems (UASs)

B-34. UASs include drones, characterized by preprogrammed flight paths and patterns, and remotely piloted vehicles, controlled by ground-based operators. Each can perform a variety of missions, ranging from reconnaissance and battlefield surveillance to attack and electronic warfare (Figure B-7).
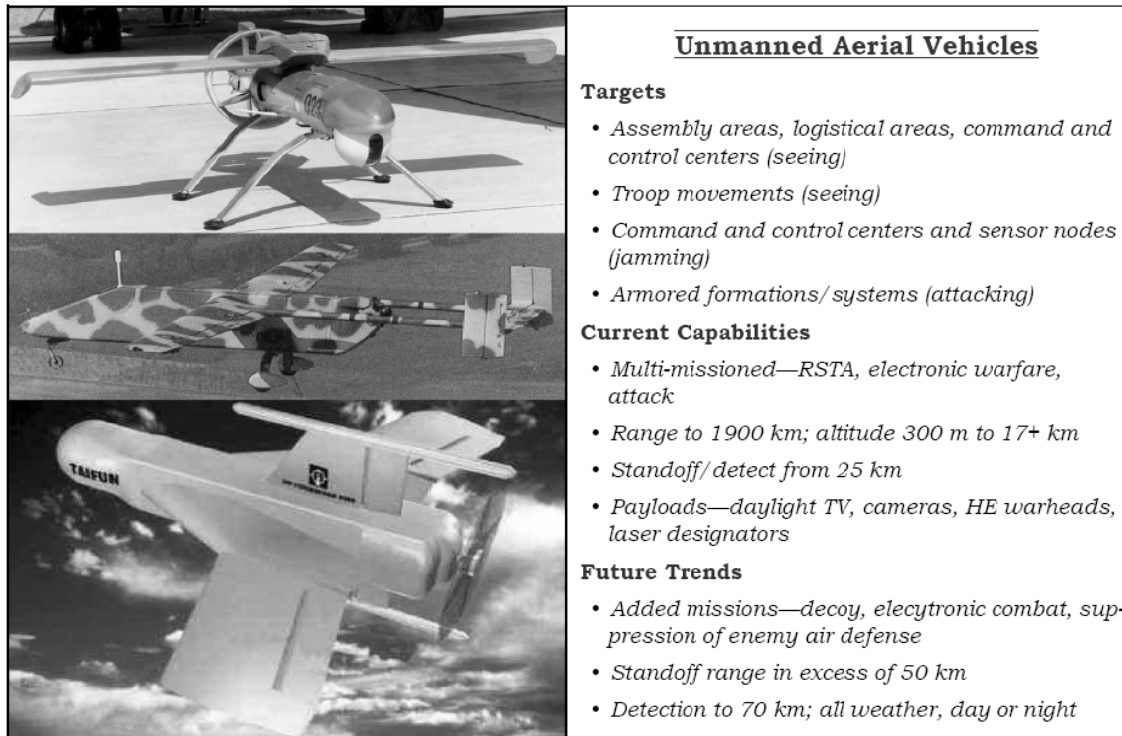

Unmanned Aerial Vehicles

Targets
- *Assembly areas, logistical areas, command and control centers (seeing)*
- *Troop movements (seeing)*
- *Command and control centers and sensor nodes (jamming)*
- *Armored formations/systems (attacking)*

Current Capabilities
- *Multi-missioned—RSTA, electronic warfare, attack*
- *Range to 1900 km; altitude 300 m to 17+ km*
- *Standoff/detect from 25 km*
- *Payloads—daylight TV, cameras, HE warheads, laser designators*

Future Trends
- *Added missions—decoy, elecytronic combat, suppression of enemy air defense*
- *Standoff range in excess of 50 km*
- *Detection to 70 km; all weather, day or night*

Figure B-7. Characteristics of unmanned aircraft systems

What Makes UASs Threatening?

B-35. UASs serve as ISR platforms for target detection, identification, and location; weapon targeting; target designation; and battle damage assessment. State-of-the-art sensors and data links provide real-time targeting for fire support systems, maneuver forces, and aircraft. UASs equipped with laser designators provide immediate targeting of assets for attack by smart munitions and field artillery.

B-36. UASs have relatively low radar cross sections, low speed, and low thermal signatures, thus making them difficult to detect, track, and engage. Mission-dictated flight profiles take full advantage of terrain, increasing system survivability and optimizing coverage. Flight altitudes are normally between 1,000 and 3,000 meters above ground level. UASs conducting ISR missions fly at altitudes safe from small arms fire. In addition, UASs can stand off and detect from up to 25 kilometers.

B-37. UAS payloads consist of daylight television, infrared video, and film cameras (for reconnaissance missions). Other major payload categories include electronic warfare, electronic intelligence, radar, and attack warheads. Several nations are developing and fielding antiradiation homing UASs with the primary mission of attacking battlefield radio frequency emitters (radars, communications). These platforms have a variety of launch options and are usually fire-and-forget systems. Other attack UASs employ terminal guidance to kill tanks or fighting vehicles.

Helicopters

B-38. Most countries maintain helicopter fleets to support military operations. While the majority of helicopters can be armed to perform a variety of roles, the attack helicopter poses the greatest threat to maneuver forces. The versatility and survivability of helicopters make them ideal for use in most combat areas (Figure B-8).
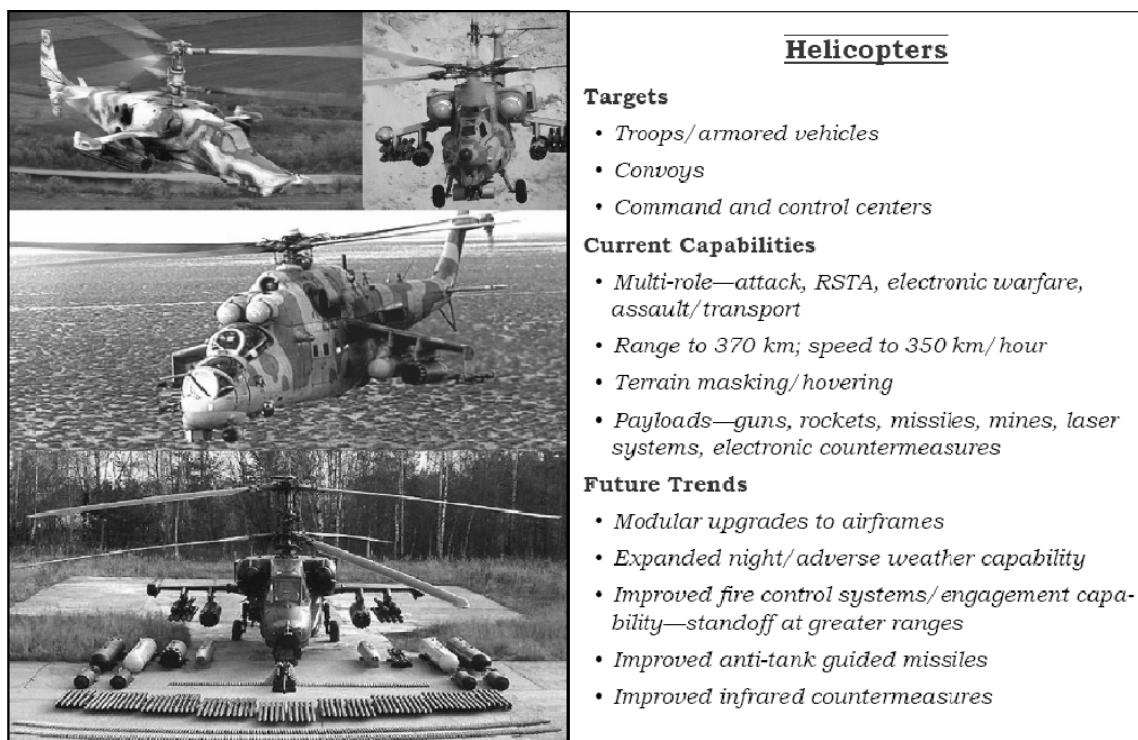

Figure B-8. Helicopters

What Makes Helicopters Threatening?

B-39. Threat ground force commanders rely primarily on helicopters to fulfill direct air support requirements. Helicopters can perform a variety of missions. Hovering and low-flying helicopters, taking full advantage of terrain masking, are difficult to acquire and target. Better fire control and weapon capabilities will enable helicopters to search, acquire, and fire at ground targets from longer standoff ranges, thus increasing their survivability and effectiveness.

Fixed-Wing Aircraft

B-40. Air power remains essential to virtually every type of military operation, and despite the emergence of TBMs and cruise missiles, it will continue to play a key role in future conflicts. There are more than 40,000 operational military aircraft today; of these, some 10,000 (many produced during the Cold War era) are in Third World inventories. Some 45 countries have an aviation industry of some kind, and 21 countries design their own aircraft. Today, the United States, France, and Russia are the leading exporters of combat aircraft (Figure B-9).

Figure B-9. Fixed-wing aircraft

What Makes Fixed-Wing Aircraft Threatening?

B-41. Fixed-wing combat aircraft are highly flexible and can perform a variety of missions in both offensive and defensive operations: air interdiction, strategic attack, suppression of enemy air defense, and close air support. Fixed-wing aircraft can employ a variety of munitions, including guns, rockets, cruise missiles, and tactical air-to-surface missiles. Integrated navigation/bombing computers and related mission equipment provide new combat aircraft with a precision-strike capability day or night and in bad weather.

B-42. New aircraft incorporate such features as radar warning receivers, on-board jammers, chaff, flares, and a lower radar cross section to improve survivability and mission success rate. In addition, the proliferation of fixed-wing aircraft throughout the world increases the probability that opposing forces may employ the same aircraft in a conflict; this will further exacerbate the already challenging problem of identification.

STRATEGIC THREAT

B-43. Despite the end of the Cold War, the threat of accidental, unauthorized, or limited strategic strikes against the United States exists. Intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs) are a threat to the United States— they carry nuclear warheads and employ a variety of penetration aids.

Intercontinental Ballistic Missiles (ICBMs)

B-44. Although the only current ICBM producers are the United States, Russia, North Korea, and China, several countries are developing production capabilities. Thus, the threat to the United States continues to grow. Other countries developing ballistic missiles are likely to also develop various responses to U.S. defenses. Developing countries would probably rely on available Russia or Chinese countermeasure technologies such as separating reentry vehicles, spin stabilizing reentry vehicles, radar absorbing material, low-power jammers, and simple (balloon) decoys (Figure B-10).
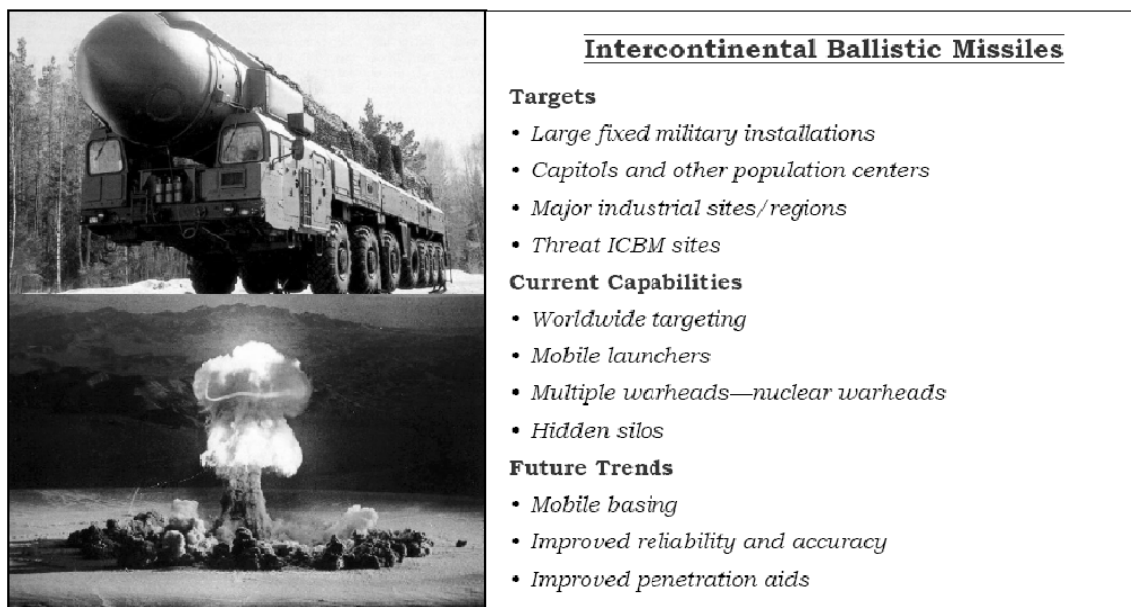
Intercontinental Ballistic Missiles

Targets
- *Large fixed military installations*
- *Capitols and other population centers*
- *Major industrial sites/regions*
- *Threat ICBM sites*

Current Capabilities
- *Worldwide targeting*
- *Mobile launchers*
- *Multiple warheads—nuclear warheads*
- *Hidden silos*

Future Trends
- *Mobile basing*
- *Improved reliability and accuracy*
- *Improved penetration aids*

Figure B-10. Intercontinental ballistic missiles

B-45. Rudimentary technologies from earlier versions of U.S. and Soviet missiles are more readily available and are adequate for use by nations not overly concerned with missile accuracy, reliability, or safety. The increased availability of technical assistance from other nations and of classified information related to ballistic missiles and weapons of mass destruction will short-cut development programs. Once launched, ICBMs are difficult to defeat. Their targets may be strategic or political, civilian or military. ICBMs will most likely use nuclear warheads, and many systems (currently only Russian ones) will carry multiple reentry vehicles. Projected improvements include mobile basing, improved reliability, increased accuracy, and improved penetration aids.

Submarine-Launched Ballistic Missiles (SLBMs)

B-46. The United States, France, Russia, and China currently produce SLBMs. Submarine mobility provides launch location options unavailable to ICBM forces and makes detection difficult. SLBMs provide ICBM capabilities with the added advantages of better hiding, shorter flight times, and depressed reentry angles. Targets will generally be identical to those of ICBMs. Projected SLBM improvements include more sophisticated payloads and guidance systems, improved reliability, increased range, and improved penetration aids.

SPACE SYSTEMS

B-47. Space is the new high ground for operations. Space systems are emerging as key force multipliers—they are critical to the tactical, operational, and strategic levels of warfighting. Space systems consist of the space mission element, the ground support element, and the control linkage between them. A separate but necessary adjunct is the space launch facility. Current military operations dating back to the 1991 Gulf War illustrate the criticality of assuring our access to space and space systems while denying it to our enemies. Space system functions include communications support, weather prediction, navigation support, surveillance, and reconnaissance (Figure B-11).
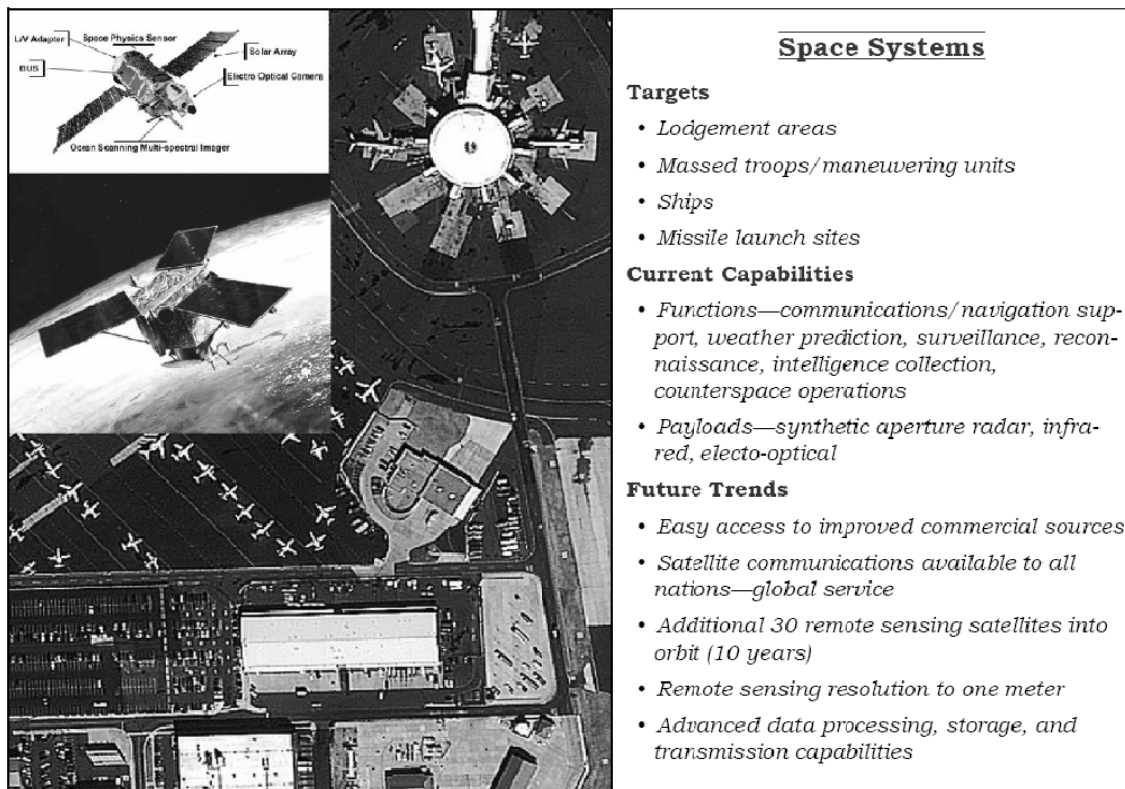
Space Systems

Targets
- *Lodgement areas*
- *Massed troops/maneuvering units*
- *Ships*
- *Missile launch sites*

Current Capabilities
- *Functions—communications/navigation support, weather prediction, surveillance, reconnaissance, intelligence collection, counterspace operations*
- *Payloads—synthetic aperture radar, infrared, electo-optical*

Future Trends
- *Easy access to improved commercial sources*
- *Satellite communications available to all nations—global service*
- *Additional 30 remote sensing satellites into orbit (10 years)*
- *Remote sensing resolution to one meter*
- *Advanced data processing, storage, and transmission capabilities*

Figure B-11. Characteristics of space systems

What Makes Space Systems Threatening?

B-48. Until recently, space systems represented revolutionary technology that only nation states could afford. Today, many of the capabilities that were once the sole purview of the military are available on the international market. Worldwide access to space system resources is available through purchasing, leasing, renting, or time-sharing available assets from one of the space developer nations or consortia. The commercial sector—not the Federal Government—now drives advancements in satellite technology and products.

B-49. The "leveling" of global technology and the multibillion-dollar space industry have spawned a robust commercial industry our adversaries can use to support a variety of military or terrorist operations. Over the next 10 years, more than 30 commercial or government-sponsored imaging satellites are planned for launch. The sheer number of these new satellites, and the fact that most are foreign or consortia owned, diminishes the ability of the United States to impose political constraints on the use of satellite imagery products. These new commercial imaging capabilities will allow an adversary to challenge the U.S. force's ability to achieve strategic and tactical surprise and to gain and sustain information superiority.

Appendix C

Air and Missile Defense Planning

This appendix describes the Air and Missile defense planning process and the specific requirements of the AMD estimate and AMD annex. The estimate process assists the force commander in decision-making. The end result of the planning process is the AADP annex detailing ADA support for the concept of the operation.

AIR AND MISSILE DEFENSE PLANNING

C-1. Air and missile defense planning is a distributed process occurring at all echelons. The JFC, or if delegated, the JFACC or AADC will task components to develop a detailed prioritized list of defended assets. The AAMDC commander in the roles of TAAMDCOORD and DAADC (AMD) is involved in this development process by assisting the ARFOR and AADC in the planning and coordination of the critical asset list (CAL) and creating the defended asset list (DAL). The JFC or JFACC/AADC goes through a staffing process with the components to merge all priorities into a single list.

C-2. The AADC develops the AADP for the theater. The DAADC (AMD) assists the AADC with the AADP development. In the role of DAADC (AMD), the TAAMDCOORD, with input from the fire support element and the Army airspace command and control element, assists the JFLCC's staff (J3 and J5) in providing recommendations on Army critical asset priorities, ADA priorities, and resource allocation to support the JFC's air and missile defense concept.

C-3. The Army Air and Missile Defense Command is the Army's focal point for planning, coordinating, integrating, and executing TAMD operations. EAC ADA brigades conduct defense planning and task organize forces to protect assigned assets from the DAL. ADA battalions continue to refine these plans and further task organize to execute air and missile defense operations. Also, the TAAMDCOORD advises the COMARFOR/JFLCC on the employment of the EAC ADA brigade to ensure integration into the theater air and missile defense plan. When necessary, corps commanders may be tasked to protect theater assets on the DAL located in the corps area using corps ADA forces.

C-4. As in the offense, the commander needs to mass enough forces at the critical place and time to defeat the enemy's airborne platform attack and deny aerial surveillance of friendly forces. The AMD plan addresses air defense protection of shaping, decisive, and sustaining operations. Lateral coordination helps to preclude coverage gaps in the defense along boundaries. Depending on the size and the mission of the covering force, the AMD plan may allocate some air defense to the covering force. If the covering force's mission is to destroy the lead elements of the enemy force, the Avenger is the more mobile weapon system. If the covering force is merely a screening force providing information, over-watching fires from air defense systems farther back may suffice.

C-5. ADA units may be allocated to protect reserve or counterattack forces, C2 nodes and logistics facilities. If the division is defending against the enemy main attack, ADA systems may be moved forward to achieve the mass and early engagement capability needed to defeat the likely attack helicopter, CM, and UAS threat. If the division is defending against what becomes a supporting attack, ADA systems can be moved to rearward positions to protect forces not committed to combat. The AMD plan must support contingency options to enable rapid transition from defensive to offensive operations. AMD plans are synchronized with the supported force and coordinated with higher and lower ADA echelons and adjacent ADA units.

C-6. The factor of METT-TC influences integrated air and missile defense planning from theater through battalion level and permits reinforcement of the synchronization process. The type of theater and defensive operation provide the framework for METT-TC analysis. The type of theater can affect our ability to collect intelligence and targeting information on the enemy. It also affects the deployment of friendly

forces and the development timeline. The integrated planning process and products are depicted in Figure C-1.
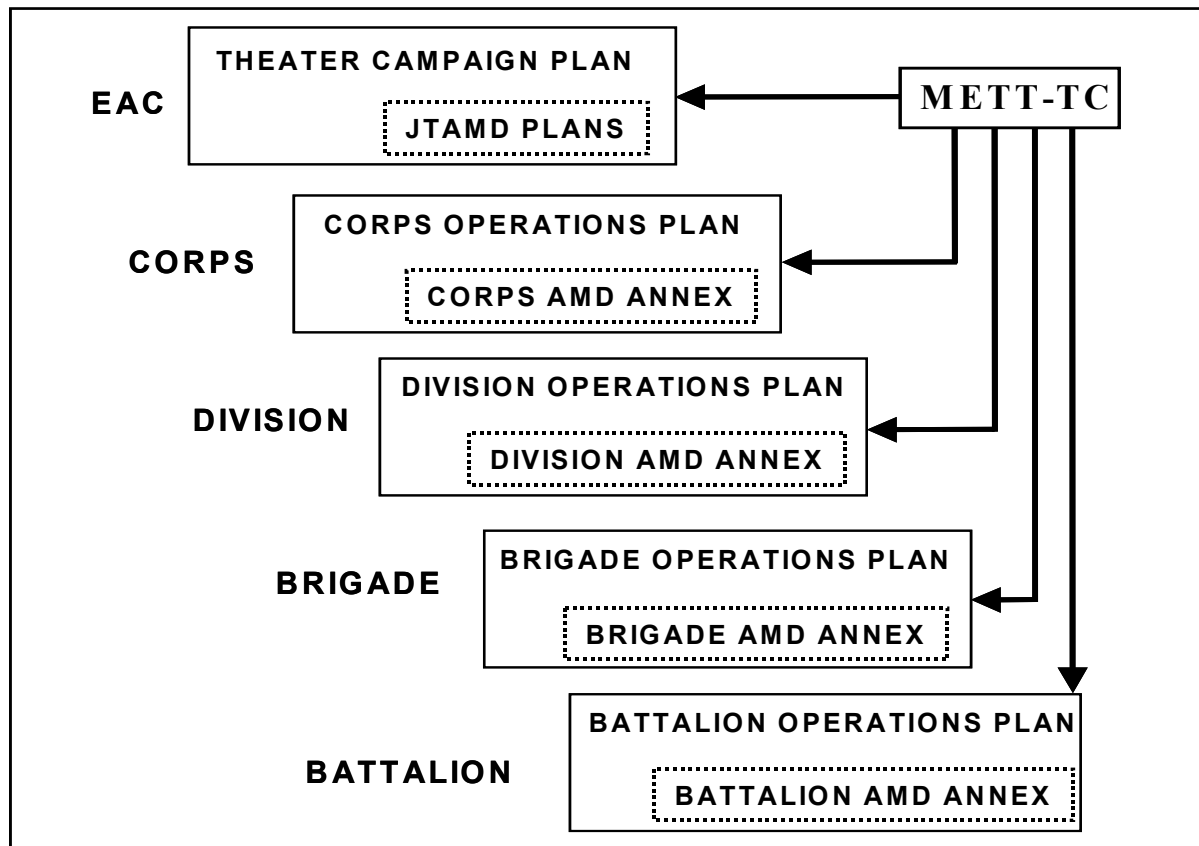

Figure C-1. Integrated air and missile defense planning

AIR AND MISSILE DEFENSE PRIORITIES

C-7. The ADA commander considers METT-TC, IPB, and the supported commander's intent, concept of operations, and develops AMD priorities. The ADA commander submits these priorities to the maneuver commander for approval. Priorities are based on the factors of criticality, vulnerability, and threat (CVT). CVT is the methodology used to evaluate each asset on the critical asset list (CAL). This methodology employs objective criteria and quantifies the level of importance of each asset. The CVT methodology assists the commander in identifying those assets to be protected from attack using available ADA resources and accepting risk as necessary. The CVT is a mission, location, and command influenced process, the numbers and weights, are changeable as required by the commanders' intent or as the changing mission dictates.

C-8. Criticality is the degree to which an asset or force is essential to mission accomplishment. Determination of the criticality of an asset or force is made by assessing the impact on the conduct of the operation that would result from damage to the asset or force. The degree of criticality is based on whether damage to the asset or force prevents, seriously interferes with, or causes only limited interference with the execution of the plan.

C-9. Vulnerability consists of two parts: susceptibility to damage, if attacked, and recuperability. Susceptibility to damage is further subdivided into two parts: hardness and dispersion. Consideration should be given to the asset or force's hardness and its ability to disperse or displace to another position. Recuperability is the degree to which an asset or force can recover from inflicted damage in terms of time, equipment, and available manpower to continue its mission.

C-10. Threat is the assessed probability of an asset or force being targeted for surveillance or attack by enemy air and missile threats. The use of threat information, to develop AMD priorities, is a reverse IPB process—what we expect enemy air to detect and attack, based on IPB. Targeting information provided by intelligence estimates, past enemy surveillance and attack methods, and enemy doctrine is useful in evaluating AMD priorities. To determine the relative importance of assets and forces, the commander considers certain characteristics, which make an asset or force a lucrative target for the enemy. In effect, this is reverse target value analysis. Intelligence estimates, past enemy surveillance and attack methods, and enemy doctrine are useful in assessing the probability that an asset or force will be targeted by the threat. This is, in effect, reverse target analysis.

Theater-Level Critical Asset Lists

C-11. The critical asset list (CAL) is a prioritized list of critical assets identified by phase of the operation. This list is developed by the J3/J5 with input from the components of the joint forces. They identify candidate assets to be protected from attack. The JFC or combatant commander approves the CAL listing and it is included in the OPLAN and AADP. The CAL development process evaluates critical assets based on CVT, ADA resources, possible defense designs, and the elements of risk to develop the defended asset list (DAL).

Defended Asset List

C-12. The defended asset list (DAL) is a JFC-approved prioritized listing of assets by phase that are to receive AMD protection. This list is included in the OPLAN and the area AADP. The DAL specifies required levels of protection for each asset. The DAL may be developed by the AADC with component input but normally the AADC delegates the DAL process to the DAADC (AMD). The DAADC (AMD)'s DAL recommendation (with component commanders input) is submitted through the AADC to the JFC for approval. Figure C-2 depicts the process used to develop the DAL.
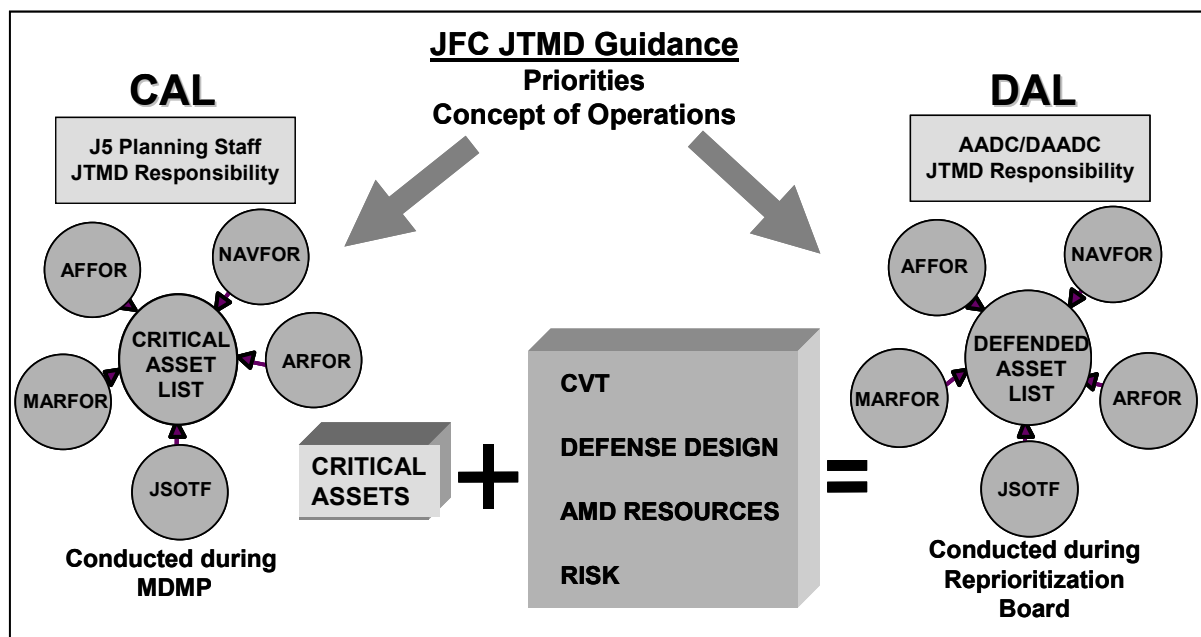
Figure C-2. CAL–DAL development process

Defense Designs

C-13. Defense designs are the implementation of AMD plans. Defense designs are the detailed positioning of the ADA systems, radar, launchers, and communications to maximize the defense of defended assets. Through defense designs, available ADA assets are arrayed to provide required levels of protection for

assets on the DAL. Defense planning is a top down interactive process that covers the full range of AMD operations from the JFC to the fire unit level. The objective of defense planning is to protect the force and critical assets in accordance with the DAL priorities. This process ensures effective ADA coverage for assets on the prioritized DAL utilizing all ADA systems available.

ACTIVE DEFENSE PLANNING CONSIDERATIONS

C-14. Army ADA units will be positioned by the appropriate ground force commander in defense of critical assets relative to suspected threat approach avenues or azimuths. Because of their limited numbers, ADA resources are allocated based on specific air and missile defense priorities. The AAMDC provides the air and missile defense annex to the ARFOR or JFLCC plan. In the air and missile defense plan, EAC ADA brigades normally will protect priority assets from the combatant commander's defended asset list. ADA commanders design defenses and task organize forces to protect designated priority assets.

PASSIVE DEFENSE PLANNING CONSIDERATIONS

C-15. Passive measures are an essential part of air and missile defense planning at all levels. All units conduct passive actions in conjunction with their assigned missions. Passive actions reduce the effectiveness of the enemy air threat. The AAMDC has an ADA passive defense cell with the necessary personnel and equipment to support the TAAMDCOORD.

C-16. The AMDCOORD evaluates and recommends passive measures for incorporation into the maneuver commander's plans and SOPs. The AMDCOORD recommends measures that may deceive, frustrate, and surprise enemy air and surveillance assets. Some examples at the operational level are moving large units at night, developing an early warning system, creating large area smoke screens, and establishing emissions control (EMCON) procedures. Some examples at the tactical level are employing radar scattering camouflage, utilizing early warning instead of local sensors, and locating units on revetted or otherwise prepared sites.

OPERATIONAL PLANNING PROCESS

C-17. Air and missile defense planning at the operational level is an interactive process. The same planning process will occur regardless of whether the Air Force, Navy or the Marine Corps is providing the majority of the air assets.

C-18. When the AAMDC is in theater, normally the AAMDC commander will be designated the DAADC (AMD) and will be the principal integrator for the JFLCC to the AADC on all air and missile defense aspects Figure C-3. An AAMDC liaison team works closely with the AADC and their staff and the BCD to accomplish air and missile defense integration. The BCD air defense section coordinates its activities with the AAMDC LNO team. The BCD air defense section may also augment the AAMDC LNO team as needed. The BCD accomplishes coordination when the AAMDC is not in theater, which locates part of its staff with the joint air operations center JAOC.
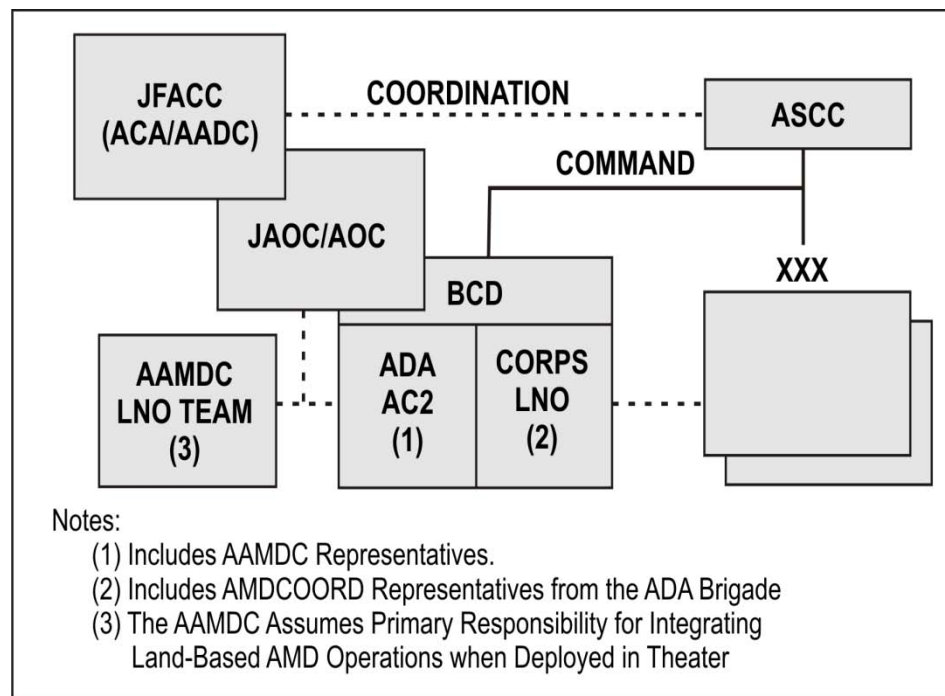
Figure C-3. AAMDC integration with JAOC and BCD

C-19. The JFLCC, through the AAMDC commander in the DAADC (AMD) role, provides an air and missile defense estimate to the AADC. The BCD may perform this handoff function when the AAMDC is not in theater. With JFC guidance, the JFACC in coordination with the component commanders develops the air operations plan.

C-20. The BCD establishes the ARFOR liaison and interface with the JFACC. The BCD eases the coordination and synchronization of the JFACC air and ARFOR ground operations. The BCD performs its mission by (1) exchanging operational and intelligence data between the JFACC and COMARFOR and (2) interpreting the land battle situation for the JFACC and the air operations situation for the COMARFOR. If the JFACC is from the USN or the USMC the BCD has a contingency mission to deploy support teams with the USN JAOC and/or Marine tactical air command center to give the same BCD functional area links as in the USAF JAOC. If the COMARFOR is not the JFLCC, the BCD will coordinate with the agency determined by the JFLCC. The BCD may also be tasked by the JFLCC to provide JFLCC input to the JFACC. The JFLCC organizes the BCD based on the type of theater and the JAOC organization. In force-projection operations involving only one corps, the corps commander will structure the BCD. The BCD provides ARFOR or, if JFLCC directed, JFLCC input into the air operations planning process. Army air and missile defense contributions are planned and coordinated through the AAMDC, EAC ADA brigade, corps, and division CPs. Refer to FM 100-13 for a more detailed discussion of the BCD.

C-21. The AADC develops the DCA portion of the plan and allocates assets for various missions (see Figure C-4). The JFLCC's TAAMDCOORD determines whether the corps has sufficient air and missile defense resources or if the JFLCC should allocate additional theater Army air defense assets for protection of the corps. The TAAMDCOORD may also recommend that the JFLCC allocate corps air and missile defense resources to protect theater assets. The TAAMDCOORD recommends to the JFLCC which assets Army ADA units can protect and which assets require other component or multinational coverage. The AAMDC is the only Army organization properly staffed and equipped to ensure AMD integration and is normally collocated with the AADC. In the absence of the DAADC (AMD) when the AAMDC is not in theater, the senior ADA commander will perform the AADC's DCA planning process. However, this is normally a DAADC (AMD) function because the AAMDC has the necessary expertise, personnel, and equipment to deploy to the AADC's location to accomplish AMD integration.
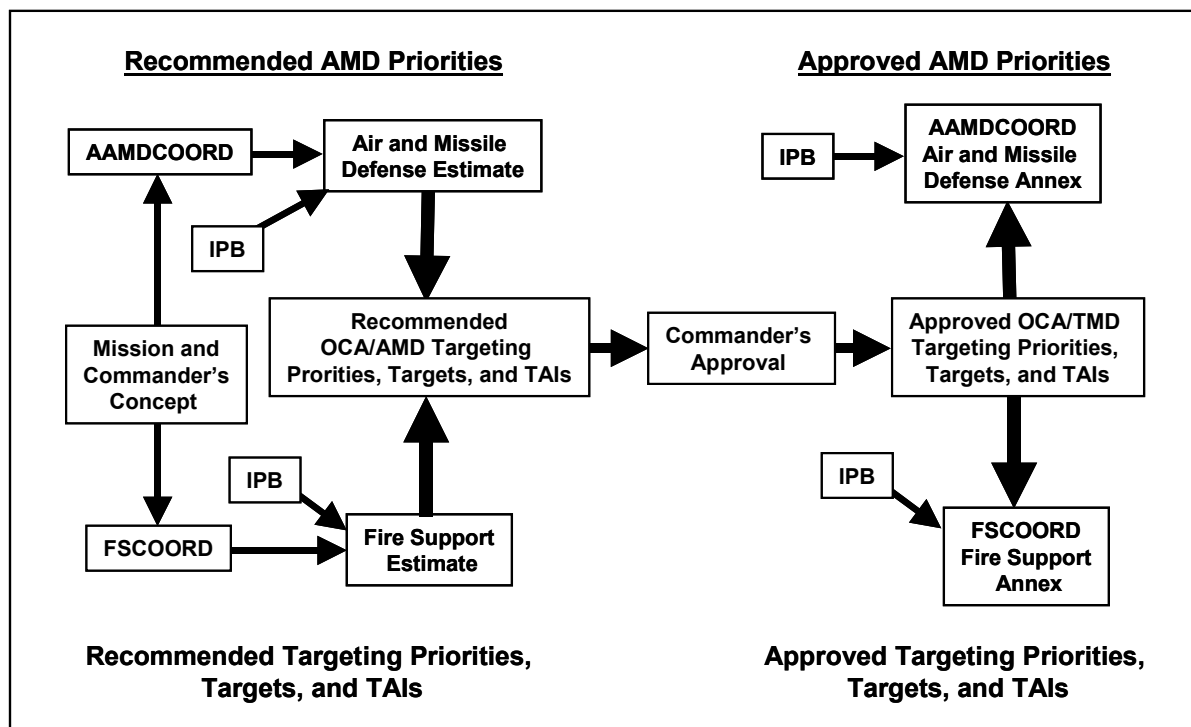
Figure C-4. Development of air defense and fire support annexes

C-22. The AAMDCs plan enables the JFLCC to finalize the air and missile defense and fire support portions of the land operation plan. The JFLCC's priorities are the foundation for interdiction targeting. The JFLCC's TAAMDCOORD develops the air and missile defense portion of the land operation plan.

C-23. The JFLCC allocates resources and assigns tasks to corps, which can sub-allocate assets and assign air and missile defense missions to divisions. In each corps and division main CP, the G3 plans section develops the maneuver plan. Within the G3 plans section, the AMDCOORD, with input from the G2, AC2 cell, and artillery's fire direction center incorporates the air and missile defense mission into this maneuver plan.

C-24. During the targeting process, the AMDCOORD, in conjunction with the G2, develops and recommends OCA and AMD targeting priorities and nominates OCA and AMD targets and target areas of interest (TAI). The AMDCOORD then develops and recommends AMD priorities to the commander for approval. The air liaison officer participates in this process by recommending suppression of enemy and air defense (SEAD) targets to the fire support coordinator (FSCOORD).

C-25. The FSCOORD and the AMDCOORD incorporate the approved priorities into the fire support annex and the air and missile defense annex of the maneuver plan. The FSCOORD integrates OCA and AMD targets, targeting priorities, and theater areas of interests into the force's fire support plan. The AMDCOORD includes the DCA and AMD active defense priorities and associated IPB products in the development and coordination of the force's air and missile defense operation.

C-26. Coordination between AMDCOORD and FSCOORD ensures that the OCA, DCA, and AMD portions of the air and missile defense effort are complementary. The integration and synchronization of DCA and AMD attack operations by the AMDCOORD and FSCOORD prevents mutual interference and maximizes unity and economy of effort.

C-27. Coordination of OCA and AMD targets between the Army and the Air Force occurs at the AOC and the control and reporting center (CRC). OCA, DCA, SEAD, and AMD plans are developed simultaneously and in concert, not as separate, isolated plans. The OCA, DCA, SEAD, and AMD plans are an integral part of the theater campaign plan and the maneuver plan at each Army echelon.

AIR DEFENSE ESTIMATE AND ANNEX PROCESS

C-28. Estimates are evaluations of how factors in each field of interest will influence the courses of action the commander considers. Estimates provide the basis for logically and analytically developing solutions to situations (both in planning future operations and fighting current operations). The staff recommends how the commander can employ the command's available assets. The commander uses this information to reach decisions.

C-29. Once a mission is received, the estimate process begins. The ADA commander develops the air and missile defense estimate in concert with the force S-3 or G-3. The ADA commander uses the IPB during the estimate process. The ADA commander gathers and analyzes facts and makes assumptions. They will use these facts and assumptions to develop logical courses of action. The commander then chooses the course of action that will best support the mission.

C-30. After the force commander selects a course of action, the AMD planning process continues. The result of this process is the air defense annex detailing AMD support for the concept of the operation.

AIR DEFENSE ESTIMATE FORMAT

C-31. The air defense estimate follows the basic staff estimate format. The air defense estimate provides information regarding the air and missile defense supportability of proposed courses of action. It also provides recommended air and missile defense priorities and an air and missile defense scheme of maneuver. This information forms a basis for the AMD plan and is presented in the air defense annex.

C-32. The estimate must be constantly reevaluated to keep it current. The factors of METT-TC, observation, cover and concealment, obstacles, key terrain, and other considerations guide the ADA commander and staff during the estimate and subsequent planning. The degree of detail presented in the estimate depends on the planning time available. However, all elements of the estimate must be considered to make valid recommendations (see Figure C-5).

AIR DEFENSE ANNEX FORMAT

C-33. The estimate of the situation assists the commander in determining the most suitable course of action to accomplish the mission. Once the commander makes this decision and clearly articulates the intent, the staff prepares OPLANs and OPORDs.

C-34. The AMDCOORD must conduct detailed coordination with other staff sections to develop this annex. The AMDCOORD derives information affecting the air defense annex from other staff estimates. Additionally, the air defense estimate helps drive these other staff estimates.

C-35. The AMDCOORD writes the plan as a five-paragraph annex to the supported unit's OPLAN or OPORD. The air defense annex assigns specific air and missile defense missions each unit must accomplish. Concurrently or sequentially, ADA units may be preparing their own OPLANs or OPORDs (see Figure C-6).

ESTIMATE OF THE AIR DEFENSE SITUATION

(Classification)

Headquarters
Place
Date, time, and zone
Message reference number

AIR DEFENSE ESTIMATE NUMBER____

References: Maps, charts, or other documents.
Time Zone Used Throughout the Estimate:

1. MISSION

When the estimate's purpose is to support the force level commander's operation, use the force level commander's mission statement. As the commander or operations officer, use the unit's mission statement when the estimate's purpose is to determine which course of action best accomplishes the support mission.

2. SITUATION AND CONSIDERATIONS

This paragraph describes the conditions under which the unit will perform its mission and the possible courses of action of the supported force.

  (a) Characteristics of Area of Operation. For this paragraph, determine those factors of the situation, which influence friendly and threat actions and which, therefore, may influence the choice of a course of action. In the absence of facts, use logical assumptions that might directly affect the mission. Includes analysis of the effects of pertinent characteristics on conducting air and missile defense operations

  1. Weather. Put the analysis of data from predicted weather and light conditions for the period in this paragraph. Assess how the weather affects friendly operations. Also include the evaluation of how weather and light conditions might affect the use of threat UASs; missiles; aircraft, both fixed and rotary-wing; and airborne or air assault operations. Try to determine or predict when the threat will probably use those assets due to the weather.

  2. Terrain. Analyze the effects of terrain, including effects on observation and fire; cover and concealment; movement (surface and air); employment of friendly and threat CBRNE weapons; communications, electronic warfare and combat surveillance; unconventional warfare; psychological operations; and other aspects of military operations. Determine key terrain and air avenues of approach. Also discuss terrain features that limit air vehicle detection or target acquisition and terrain that might canalize or force air targets to fly a particular profile. Try to determine where the threat will most probably use air assets.

  3. Other pertinent factors. List analysis of political, economic, sociological, psychological, and other factors (such as hydrograph, environment, communications, science, technology, materiel, transportation, safety and accident prevention, and manpower). Include deduction about their effects on friendly and threat operations.

Figure C-5. AMD estimate general format

AIR DEFENSE ESTIMATE NUMBER____

(b) Threat Forces. A threat evaluation discusses threat capabilities that are or may be a threat to the operation.

1. Disposition. List locations of threat forces that will participate in air or missile operations or that threaten friendly air and missile defense operations. Determine combinations of air platforms that the threat may use when conducting a particular type of operation.

2. Composition. The threat organization for combat includes identity of units, types of air platforms and missiles, and armament. Also address the expected number of sorties and missiles to be flown per day, and possible composition of those sorties.

3. Strength. Consider numbers, sizes of committed and reinforcing units. Consider the location of the threat, threat doctrine, and the unit's mission. Identify air and missile assets and air support units that could or may affect the operation. When, where, and how many air platforms will the threat fly during this operation?

4. Other considerations. Threat forces not discussed above.

5. Recent and present significant activities. Summarize recent threat activities that were both successful and unsuccessful activities. Highlight any threat air activity to include number, type of air platforms, and locations.

6. Peculiarities and weaknesses. Indicate threat peculiarities and weaknesses that might influence combat effectiveness, including vulnerability to deception.

7. Threat courses of action. A compilation of available information from which to draw conclusions about possible threat air courses of action and how they relate to the threat ground courses of action.

(c) Friendly forces. The friendly force air and missile defense forces disposition, composition, and strength. Highlight the vulnerability of the force to threat air and missile attacks and surveillance.

1. Friendly courses of action. State the force commander's course of action. Include any guidance that affects air and missile defense operations. Include description of any phasing of operations in the courses of action and the impact of those operations on support relationships or requirements.

2. Current status of resources within staff area of responsibility. Report the status of personnel and logistics in the unit. Identify civil-military operations requirements. Identify limitations that affect or may affect the conduct of air and missile defense operations. Can the mission be accomplished?

3. Current status of resources that affect AMD area of responsibility.

4. Comparison of requirements versus capabilities and recommended solutions.

5. Key considerations (evaluation criteria) for COA supportability.

(d) Assumptions.

Figure C-5. AMD estimate general format (continued)

AIR DEFENSE ESTIMATE NUMBER____

3. ANALYSIS

Analyze each COA using evaluation criteria to determine advantages and disadvantages. Identify those aspects in the commander's plan, which create difficulty in providing air and missile defense coverage and affect the ability of the force to accomplish its mission.

4. COMPARISON

Compare COAs using evaluation criteria. Evaluate and rank-order COAs for each key consideration. A decision matrix should visually support comparison. Present an AMD course of action for each of the supported force courses of action. Each AMD course of action presented should include the following aspects:

- Air defense mission.
- Air defense priorities.
- Air defense fires.
- Air defense scheme of maneuver.
- AMD task organization.
- Command and support relationships.
- Key passive AMD measures.
- Type of action required in each operational area (close, deep, and rear).
- Combined arms for air defense active measures.

5. RECOMMENDATION AND CONCLUSIONS. Recommended COAs based on the comparison.

- Indicate which course or courses of action AMD can best support (using the elements of who, what, when, where, how, and why).
- Recommend a list of AMD priorities.
- State the recommended AMD organization for combat, and employment of other active air and missile defense assets.
- Possible OCA targets.
- Passive and active air and missile defense measures that will be most effective.
- Issues, deficiencies, and risks with recommendations to reduce their impacts.

_____
NAME
RANK
(Air Defense Coordinator)

ANNEXES: (as required)

ESTIMATE OF THE AIR DEFENSE SITUATION

(Classification)

Figure C-5. AMD estimate general format (continued)

Copy___of___copies
Issuing headquarters
Place of Issue
Date-time group of signature

Message Reference Number

ANNEX G (AIR DEFENSE) TO OPERATION ORDER NO _____

References: Maps, charts, or other relevant documents.
Time Zone Used Throughout the Order:
Task Organization:

1. SITUATION

    a. Enemy. See Annex B (Intelligence).

        1. Terrain. Identify most likely threat ingress and egress routes.

        2. Weather. Identify threat aircraft all-weather capabilities and limitations.

        3. Threat air capability and or activity.

           (a) Air threat data. List air-capable organizations including air platforms by number and type.

           (b) Additional air threat information. List airs threat information pertinent to the operation but not covered in the <u>Intelligence Annex</u>. Highlight specific air threat considerations like sortie rates, subordination of air elements to ground units, ordnance peculiarities, target preferences, tactics, and recent significant activities.

           (c) Air avenues of approach. Lists all expected air avenues of approach and identify by air platform their potential users. List all known-beginning points and describe avenue of approach as it goes through the area of interest.

    b. Friendly situation. AMD missions at all applicable levels. Describe how the air defense plan integrates with higher echelon plans.

        1. Higher units. Outline higher AMD unit intent and plans.

        2. Adjacent units. Outline adjacent AMD unit intent and plans.

        3. Supporting elements. Note supporting units and support relationship.

    c. Attachments and detachments. Identify air and missile defense resources attached from other commands and identify those air and missile defense resources detached.

2. MISSION

Mission statement should include who, what, when, where, how, and why statement of the mission for the AMD unit.

Figure C-6. AMD annex general format

3. EXECUTION

    a. Scheme of AMD support. Commanders overall AMD plan to include the intent, objectives, and priorities.

    b. Tasks to subordinate units. Briefly discuss AMD plan, command and support relationships, and priority of protection.

    c. Coordinating instructions. Instructions are applicable to two or more subordinate units. Include references to other applicable annexes.

        1. Coordination instructions for ADW, ADW, and LADW authority.

        2. WCS authority. Include any plans to change WCS.

        3. Hostile criteria. Basic rules the commander has established to assist in the identification of friendly or hostile air vehicles. Include pre-planned changes.

        4. Rules of engagement. Address ROE unique to the operation or points in the operation where changes are intended. Include use of supplemental fire control measures.

        5. Passive air defense. Addresses specific passive air defense measures that all units should take to protect themselves from air and missile attack or surveillance during this operation.

        6. Combined arms for air defense. Briefly discuss specific techniques units should use to help in defending themselves against an air or missile attack or surveillance.

        7. Early warning. Review method and format for passing early warning to the entire force.

4. SERVICE SUPPORT See Service Support Annex.

5. COMMAND AND SIGNAL

    a. Command.

        1. AMD CP locations.

        2. Succession of command.

    b. Signal. See Signal Annex.

        1. IFF code edition and book number.

        2. Communications links for early warning equipment.

ACKNOWLEDGE:
OFFICIAL:

                              RANK (Commander's rank)
                              NAME (Commander's last name)

APPENDIXES:
DISTRIBUTION:

                ANNEX G (AIR DEFENSE) TO OPERATION ORDER NO _____

                      (Classification)

Figure C-6. AMD annex general format (continued)

Appendix D

Impact of Technology on ADA Forces

This appendix covers the impact of technology on our forces. Army ADA is transforming to align with the transformation of the Army and Joint services. The transformation will require the Army ADA community to become more mobile, smaller, and able to overcome a changing asymmetric air and missile threat. The transformation will provide for a more responsive, versatile, and adaptive ADA force. The transformed ADA force must provide a more scalable, mission-tailored, multifunctional capability for both the Army and the joint forces commanders. We will no longer be a weapon centric force but, we will be a capabilities, and system of systems force that will allow ADA forces to perform the AMD mission at the strategic, operational, and tactical level in a wide range of military operations.

IMPACT OF TECHNOLOGY

D-1. Improved ADA weapon system technology provides commanders increased flexibility for defensive counterair operations. The fusion of information from communications system, C2, and ISR, fire support, and ADA systems combined with the commander's judgment allows commanders to understand their battlespace and conduct fluid noncontiguous operations from widely dispersed locations. A SIAP/COP based on this fused information helps commanders make better and quicker decisions.

D-2. The increasing range and precision of direct and indirect fires allow Army forces to weaken attackers and shape the situation before entering close combat. Improved C2, communications system and ISR systems allow commanders to disperse their forces without losing the ability to mass effects at the decisive time and place.

D-3. Dispersed Army forces present tactical challenges to air defense artillery forces. Modern technology is providing ADA forces with the means for protection of the force. Trained soldiers and decisive leaders apply those capabilities in uncertain situations to defeat enemies and transition to offensive operations that achieve the desired end state.

D-4. These new ADA systems and capabilities include Terminal High Altitude Air Defense (THAAD), Non Divisional Patriot PAC-3, Joint Land-Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS), Enhanced Target Range and Classification and maneuver AMD systems Surface-Launched Advanced Medium Range Air-to-Air Missile (SLAMRAAM), Medium Extended Air Defense System (MEADS), and communications and Intelligence systems.

D-5. There are emerging technology improvements that will improve the capabilities of air defense that include; Beyond Visual Range (BVR), and Single Integrated Air Picture (SIAP), Non-Line-of Sight (NLOS).

BALLISTIC MISSILE DEFENSE SYSTEM

D-6. The THAAD weapon system provides the Combatant Commander a rapidly deployable ground-based, hit-to-kill, wide area missile defense capability and components that deepen, extend and complement ADA systems and the Ballistic Missile Defense System. THAAD is an element of the Terminal Defense Segment of the BMDS. Terminal Defense Elements provide the last best opportunity to engage ballistic missiles not engaged or destroyed in the boost or mid-course phases of their trajectories. The THAAD element contributes significant capability to the BMDS in its ability to engage and negate ballistic missiles in both the late mid-course (exo-atmospheric engagements) and terminal phase (endo-atmospheric engagements) of their trajectories. THAAD's powerful radar and versatile C2BMC provide early warning surveillance and discrimination capability to the AMD and BMDS systems through provision

of precision cues and discrimination data. Integrated with AEGIS, Patriot, and the BMDS Command and Control, Battle Management and Communications (C2BMC), the rapidly deployable THAAD improves BMDS and ADA overall effectiveness.

NON-DIVISIONAL ADA

D-7.   Patriot Configuration-3 is a block in a series of time-phased changes to the Patriot system to meet the Patriot advance capability-3 (PAC-3) program requirements. This configuration consists of several hardware modifications, a new missile, and the fielding of the post deployment build-5/5+ (PDB-5/5+) software. The PAC-3 program provides enhanced system performance against advanced air and missile threats.

D-8.   These changes are advancements in technology designed to improve the search, detection, and tracking capabilities of the radar; improve the discrimination of TBMs warheads from debris; increase battlespace; improve communications within the battalion; improve interoperability with the THAAD system and joint forces; enable BMs launch point determination; and finally, increase lethality against BMs. In addition, these modifications provide increased system reliability, availability, maintainability, and simplify operations.

D-9.   The PDB-5/5+ software supports the hardware modifications and user requirements for the Patriot PAC-3 program. This software is comprised of those changes necessary to support the Configuration-3 hardware modification such as Radar Enhancement Phase-3, classification discrimination identification, remote launch and communications enhancement upgrade, THAAD integration and the PAC-3 missile integration. The PDB-5/5+ software also include several new requirements, which were implemented with software changes.

D-10. Patriot Configuration-3 enhancements provide increased firepower and lethality. The upgrade to communication equipment provides improved voice and data capabilities for internal and external integration. This enhancement increases Patriot's capability to conduct multiple simultaneous engagements, increases track handling capabilities, extends engagement range. Configuration-3 is designed to counter a growing threat that is capable of conducting massed aircraft raids, integrated ballistic missile attack, and aerodynamic missile raids. Figure D-1 is an overview of the PAC-3, Configuration-3 Enhancements.

D-11. The Joint Land-Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS) consists of an aerostat with radars to provide over-the-horizon surveillance for defense against cruise missiles. JLENS is primarily intended to tackle the growing threat of cruise missiles to U.S. forces deployed abroad. The system enhances cruise missile detection and engagement ranges with current air defense weapons JLENS will operate at altitudes between 10,000 and 15,000 feet; be capable of detecting long range, terrain masked targets; and provide an effective fire control solution for joint theater air and missile defense weapon systems. Additionally, it can operate from sites on both land and sea, and is tactically re-locatable. Comparing these capabilities against the performance of our current sensor systems, the value added of JLENS is readily apparent.
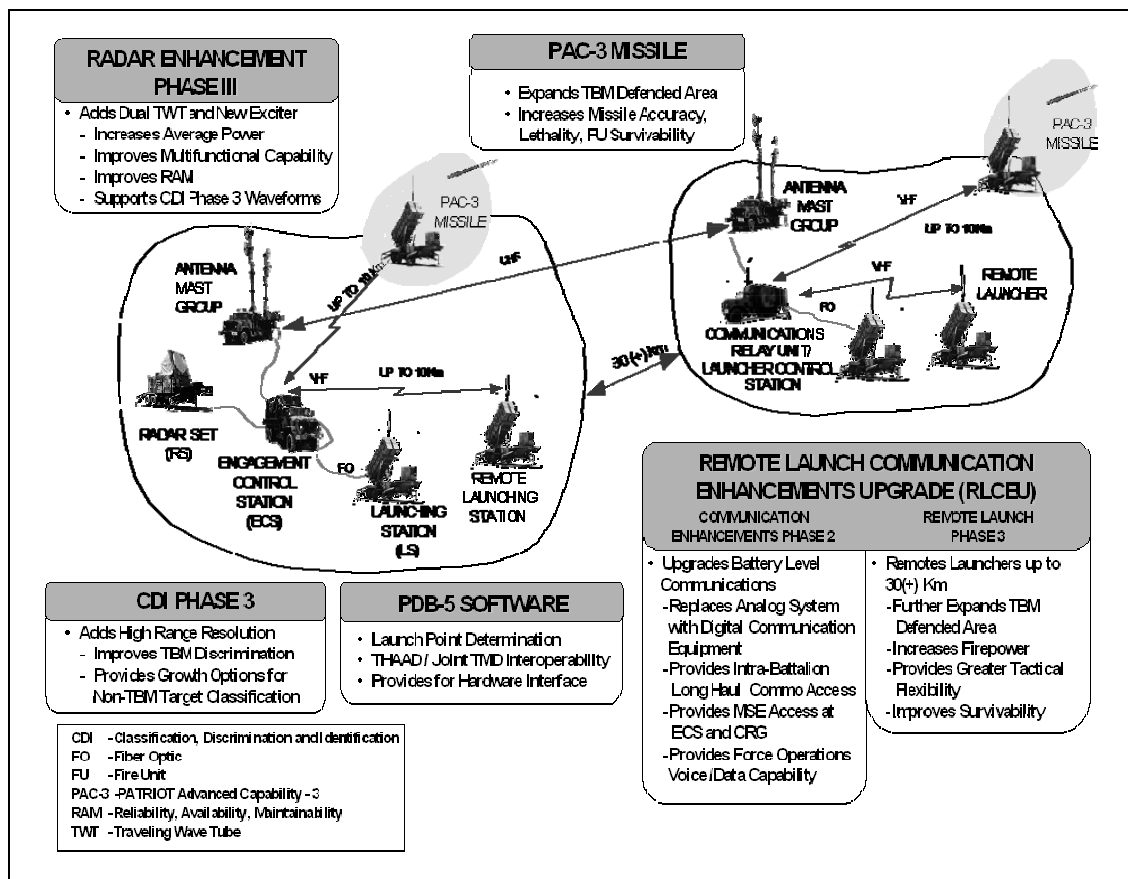
Figure D-1. PAC 3, Configuration-3 enhancements

MANEUVER AMD

D-12. Avenger/man-portable air defense system (MANPADS) improvements in digital technology allow ADA forces to extend the battlespace further than before possible. Threat aircraft may be engaged at distances that maximize the range of Stinger missiles. In accordance with ROE, the forward area air defense (FAAD) communications and Intelligence system allows beyond visual range (BVR) engagements. These engagements are capable because of the continued improvements of the battle command system, FAAD communications and Intelligence and ADA weapons, and are dependent on METT-TC. BVR eliminates the visual hostile ID requirement for Avenger shooters. MANPADS systems still require visual identification of hostile aircraft. BVR stresses the use of externally provided track data to engage hostile aerial platforms and allows the communications and Intelligence system to be utilized as a cueing/electronic warfare (EW) system.

D-13. Enhanced Target Range and Classification (ETRAC) improves the Sentinel radar capabilities to detect small radar cross section targets like cruise missiles, and unmanned aerial vehicles to enable identification of target beyond visual range.

D-14. Surface-launched advanced medium range air-to-air missile (SLAMRAAM) is a lightweight, day or night, limited adverse weather, non-line-of-sight launcher. SLAMRAAM is used to counter low altitude RW, FW, CM, UAS, and ISR platforms. SLAMRAAM is replacing the Stinger based systems. It supports engagements in close combat areas where maneuvering forces and their supporting units operate together. SLAMRAAM's force protection mission is to engage the low-altitude aerial threats at longer range than the Stinger missile of today.

D-15. SLAMRAAM system is mounted on a high mobility multipurpose wheeled vehicle (HMMWV) with a basic load of four (4) to six (6) AIM-120 Advanced Medium Range Air-to-Air Missiles mounted on a turntable. Targets can be engaged using unattended remote control (primary mode) or a local control console (secondary mode).

D-16. Primary mode of fire control, target designation, and engaging platform selection is made from the senior integrated fire control station (IFCS) or air and missile planning and control station (AMDPCS) and transmitted over existing FAAD communications system and Intelligence networks. In all cases the SLAMRAAM control console may be used to monitor and engage targets and to conduct operations in the theater.

COMMAND AND CONTROL

D-17. The air defense tactical operations center is located with the TAOC and consists of the S-2, S-3, and the air battle management operations center (ABMOC). The AMDCOORD is located at the division's main CP and consists of the AMDCOORD equipment and staff. The air lines of communications are deployed based on METT-TC and consists of the executive officer (XO), S1, and S4. The corps ADA element is located at the corps main headquarters.

D-18. The air defense and airspace management (ADAM) cell in its airspace management role, coordinates, synchronizes, and executes in the third dimension for support of maneuver, fires, and effects.

D-19. ADAM cell personnel coordinate existing and proposed airspace control measures with ADA forces and AC2 elements of the maneuver force. The ADAM cell receives and distributes the relevant data from the ACO and ATO, interprets and displays the procedural airspace control means (for example, corridors, restricted operations zones) and schedules friendly air operations that may impact on SBCT operations.

D-20. The ADAM cell also coordinates existing and proposed airspace control means with all elements of the SBCT force. Close coordination between ADA forces, airspace control, and other airspace users is imperative to ensure safe, unencumbered passage of friendly aircraft while denying access to enemy aircraft and missiles.

D-21. The ADAM cell also serves to identify and plan airspace management positive and procedural control requirements, and de-conflict airspace by monitoring both enemy and friendly aerial activities.

D-22. The ABMOC plays a critical role in the Beyond visual Range Engagement process. Constant track monitoring provides near real time surveillance and acquisition. The ABMOC tactical control officer disseminates fires and manages by exception, meaning, the fire unit requests permission to engage using BVR engagements and the tactical control officer (TCO) confirms. The ABMOC TCO will be the final approval for beyond visual range engagements. The ABMOC TCO will also determine distances between tracks to coincide with the "in the vicinity" condition that will allow or prevent the BVR engagement process. The primary tool the ABMOC TCO will use to determine distance is the AMDWS. The AMDWS provides maps of varying scales to assist the operator. The operator may also use the cursor to determine distance.

EMERGING

D-23. Beyond Visual Range allows ADA units a marked increase in their abilities to conduct engagement beyond visual range. ADA units receive and pass digital early warning information on tracks beyond visual range of the shooter. This is made possible with the advent of the Forward Area Air Defense (FAAD) C2 information architecture that extends the integrated air picture from the engagement operations station in the ABMOC through the radar sensor and C2 nodes to the hand-held terminal unit at each weapon system.

D-24. The FAAD C2 information system allows data from higher echelon units and the joint data network (JDN), to be passed via the ABMOC to an ADA gunner. This data link capability gives the gunner and the respective team chief/squad leader an enhanced capability to potentially engage hostile air threats beyond their visual identification range, as long as the ROE engagement criteria are met.

D-25. Joint doctrine fully supports engagement of aerial threats beyond the visual range of the shooter(s) as long as a positive identification authority has tagged the target as hostile. JP 3-01 states, "Employment of defensive weapon systems requires early identification of Friend, Neutral, or Hostile aircraft and missiles to maximize beyond-visual-range engagements and avoid fratricide."

D-26. BVR engagement does not allow the gunner to shoot at all tracks. The gunner must follow the established procedural control (WCS, ADW, volumes, etc.). If the data link to higher controlling system is lost, BVR engagements will not occur. If track data is lost, the track must be visually identified before engaging. The following conditions will apply to utilize BVR–

- Theater ROE must allow the use of BVR.
- Track is positively identified as hostile by the ID (identification) authority.
- Information link to the source that is providing the track data must be stable.
- There must be no friendly or unknown platforms in the vicinity (required separation distance will be disseminated in the daily ACO as determined by the JFC) of the track to be engaged.
- Line-of-sight must exist between the target and the firing unit for missile lock to occur (unit may or may not see target for visual ID).

SINGLE INTEGRATED AIR PICTURE (SIAP) AND COMMON OPERATING PICTURE (COP)

D-27. The single integrated air picture (SIAP) and common operating picture (COP) will consist of common, continuous, and unambiguous tracks of detected airborne objects in the surveillance area Figure D-2. Each object within the SIAP will have one, and only one, track number, identification, and set of associated characteristics. The SIAP will be developed from real-time and near real-time data. Information available via the SIAP will facilitate CID, allowing aerial objects to be accurately and absolutely identified as friend, hostile, or neutral.

D-28. Commanders and staffs can utilize the SIAP and COP to analyze and comprehend the air-ground situation to determine relevant information gaps, potential enemy options/actions, the consequences of friendly actions, and the effects of the information environment on friendly and enemy actions. These contributors enable and complement full spectrum operations. Specific objectives that contribute to information superiority include the following–

- Develop and maintain a comprehensive picture of enemies and adversaries; forecast their likely actions.
- Deny enemy and adversary information about friendly ADA forces and operations with radar emission control (EMCON) procedures.
- Influence enemy perceptions as to the positions of friendly ADA forces.
- Influence defense of critical and geopolitical assets.
- Continually provide relevant information (including targeting and intelligence) to support the decision-making process.
- Synchronizing airspace essential to successful three-dimensional air and ground combat operations.

D-29. Sensor data will be used to create a scaleable and filterable single SIAP and COP that will provide for force-wide understanding of the battlespace. Information management has four basic steps; identify information requirements, collect and process, build a COP, and develop understanding. Information management begins with the identification and/or updating of information requirements.

D-30. ADA sensors and communications system elements integrated within the joint architecture will provide continuous tailored situational awareness for situational understanding. Additionally, ADA communications system elements provide tactical mission planning and rehearsal capabilities that allow commanders and their staffs to wargame courses of actions (COAs) and formulate battle plans en route to and while in the maneuver area of operations.
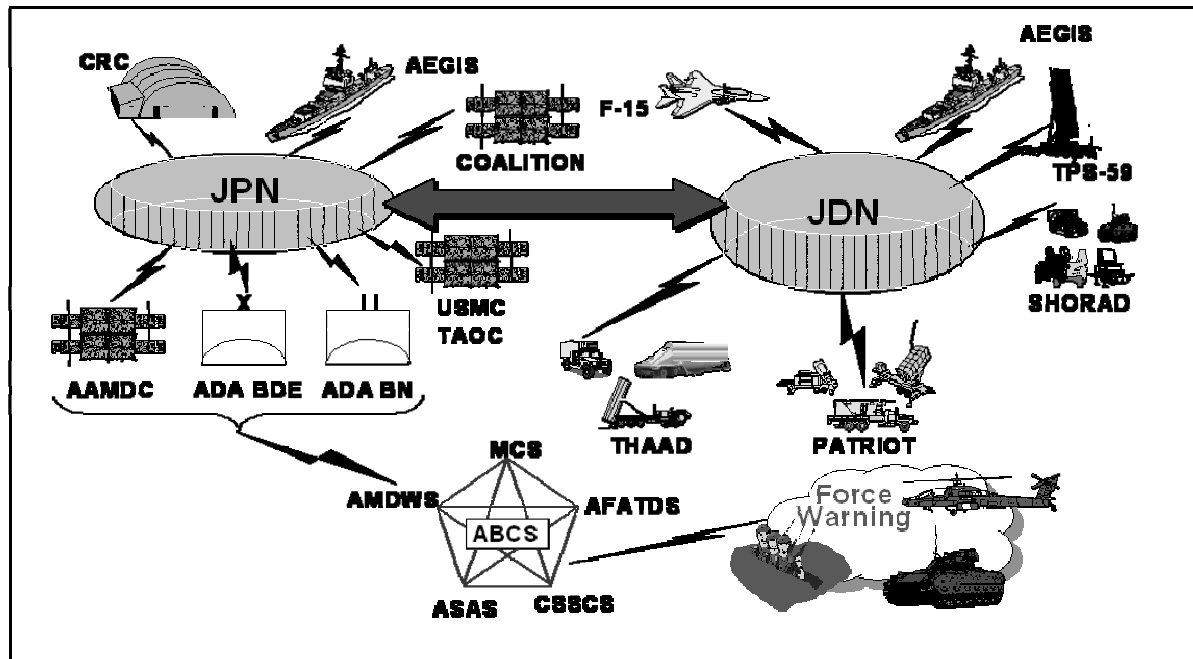
Figure D-2. Example of single-integrated air picture

NON-LINE-OF-SIGHT (NLOS)

D-31. NLOS engagements utilize the JLENS and presently Patriot, and in the future other ADA systems to engage CMs and other non-TBM targets beyond the horizon, and out to the kinematic limits of ADA systems.

D-32. The JLENS system technology allows for other engagement improvements such as; Engage-On-Remote, and Forward Pass through its fire control quality data and identification which is provided on a real-time basis to Patriot units currently, and future ADA systems.

KILL BOX

D-33. The concept of the "Kill Box" and its use and employment in the Air Defense community is new. The Kill Box is used by both the Air Force in its mission, and for the Army's field artillery unit's mission. The Kill Box is a three-dimensional Fire Support Coordinating Measure (FSCM) used for air-to-surface lethal fires in the supported commander's Area of Operations (AO) (see Figure D-3).

D-34. The purpose of a Kill Box is an FSCM, which facilitates the expeditious attack of surface targets. When established, the purpose of a Kill Box is to allow air assets to attack surface targets without terminal attack control. A Kill Box will not be used for Close Air Support (CAS) missions.

D-35. A Kill Box is established and adjusted by the appropriate supported commander within their AO. If possible, Kill Box lateral boundaries should be defined using the Common Geographic Reference System, but could follow well-defined terrain features or may be located by grid or by a radius from a center point. Changes to a Kill Box require notification of all affected forces within the AO and must allow sufficient time for these forces and/or components to incorporate the Kill Box change.

D-36. Presently the only ADA system that utilizes the Kill Box is Patriot with the Post Deployment Build PDB 6 software upgrade.
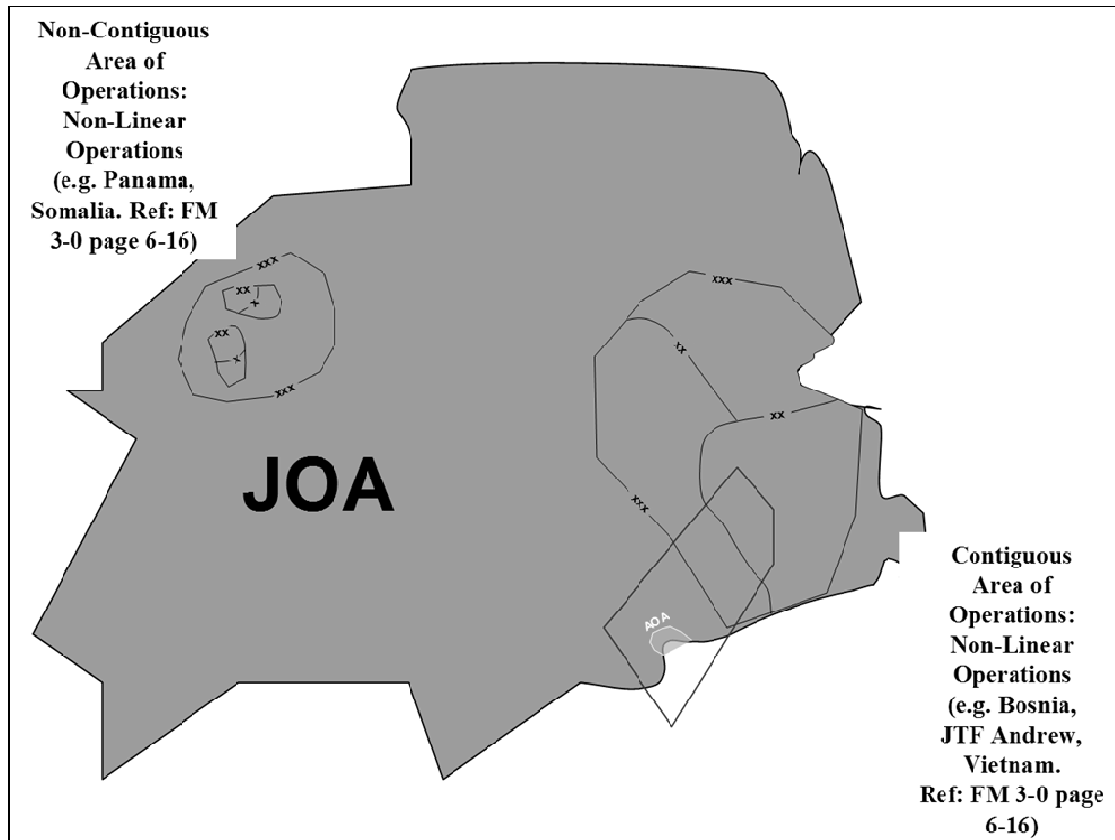
Figure D-3. Kill box

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Glossary

AADC	area air defense commander
AADP	area air defense plan
AAMDC	Army air and missile defense command
ABCS	Army battle command systems
ABMOC	air battle management operations center
ABT	air-breathing threat
AC2	airspace command and control
ACA	airspace control authority
ACE	analysis and control element
ACM	airspace coordinating measure
ACO	airspace control order
ACP	airspace control plan
AD	air defense
ADA	air defense artillery
ADAFCO	air defense artillery fire control officer
ADAM	air defense airspace management
ADHPM	artillery-delivered, high precision munitions
ADIZ	air defense identification zone
ADOA	air defense operations area
ADW	air defense warning
AFFOR	Air Force forces
AMC	Air Mobility Command
AMCOM	Aviation and Missile Command
AMD	air and missile defense
AMDCOORD	air and missile defense coordinator
AMDPCS	air and missile defense planning and control system
AMDWS	air and missile defense workstation
AO	area of operations
AOC	air operations center
AOR	area of responsibility
APOD	aerial port of debarkation
ARFOR	Army forces
ARSTRAT	Army Strategic Command
ASM	air-to-surface missile
ASP	ammunition supply point
ATO	air tasking order
AUTL	Army Universal Task List

AWACS	Airborne Warning and Control System
BCD	battlefield coordination detachment
BCT	brigade combat team
BM	ballistic missile
BMDS	ballistic missile defense system
BVR	beyond visual range
C2	command and control
C2BMC	command and control, battle management, communications
CA	counterair
CAL	critical asset list
CAOC	combined air operations center
CAS	close air support
CBRNE	chemical, biological, radiological, nuclear, and high-yield explosives
CCDR	combatant commander
CCIR	commander's critical information requirement
CDR	Commander
CDI	Clarification, determination, and identification
CG	commanding general
CID	combat identification
CJCSI	Chairman of the Joint Chiefs of Staff instruction
C/JFLCC	combined/joint force land component commander
CM	cruise missile
CMMC	corps materiel management center
CMO	civil-military operations
CND	computer network defense
CNR	combat network radio
COA	course of action
COCOM	combatant command (command authority)
COMARFOR	commander, ARFOR
COMMZ	communications zone
CONUS	continental United States
COP	common operational picture
COSCOM	corps support command
CP	command post
CRC	control and reporting center
CSA	corps storage area
CSSB	combat sustainment support brigade
CSSCS	combat service support control system (legacy term)
CVT	criticality, vulnerability, threat
CZ	combat zone
DA	Department of the Army

DAADC(AMD)	deputy area air defense commander for AMD
DAL	defended asset list
DAO	division ammunition officer
DCA	defensive counterair
DIRLAUTH	direct liaison authorized
DISCOM	division support command
DLA	Defense Logistics Agency
DOCC	deep operations coordination cell
DOTMLPF	doctrine, organization, training, materiel, leadership and education, personnel, facilities
DP	decision point
DS	direct support
DSP	Defense Support Program
EA	electronic attack
EAC	echelons above corps
ECS	engagement control station
EEFI	essential element of friendly information
EMCON	emissions control
EO	engagement operations
EPLRS	enhanced position location reporting system
ETRAC	enhanced target range and classification
EW	electronic warfare
FAA	Federal Aviation Administration
FAAD	forward area air defense system
FARP	forward arming and refueling point
FC	fires cell
FCC	fire control center
FDC	fire direction center
FEZ	fighter engagement zone
FFIR	friendly force information requirement
FLIR	forward-looking infrared
FM	field manual; frequency modulation
FO	force operations
FSCM	fire support coordination measure
FSCOORD	fire support coordinator
FSU	former Soviet Union
FW	fixed wing
G-1	assistant chief of staff, personnel
G-2	assistant chief of staff, intelligence
G-3	assistant chief of staff, operations
G-4	assistant chief of staff, logistics
GBMD	Global Ballistic Missile Defense

GCC	geographic component commander
GMD	ground-based midcourse defense
GS	general support
GS-R	general support - reinforcing
HAD	homeland air defense
HAS	homeland air security
HASCC	Homeland Air Security Coordination Center
HASD	homeland air security director
HHB	headquarters and headquarters battery
HIDACZ	high density airspace control zone
HIMEZ	high-altitude missile engagement zone
HNS	host-nation support
IA	information assurance
ICBM	intercontinental ballistic missile
ID	identification
IEW	intelligence and electronic warfare
IFF	identification, friend or foe
IFCS	Integrated fire control station
IM	information management
IO	information operations
IPB	intelligence preparation of the battlefield
IR	information requirement
IRBM	intermediate-range ballistic missile
ISR	intelligence, surveillance, reconnaissance
ITW/AA	integrated tactical warning and attack assessment
J-3	operations directorate of a joint staff
J-5	plans directorate of a joint staff
JAOC	joint air operations center
JDN	joint data network
JEZ	joint engagement zone
JFACC	joint force air component commander
JFC	joint force commander
JFLCC	joint force land component commander
JFMCC	joint force maritime component commander
JIIM	joint, interagency, intergovernmental, multinational
JLENS	Joint Land-Attack Cruise Missile Defense Elevated Netted Sensor System
JOA	joint operations area
JP	joint publication
JSOTF	joint special operations task force
JSTARS	Joint Surveillance Target Attack Radar System
JTAGS	joint tactical ground station

JTIDS	Joint tactical information distribution system
JTF	joint task force
LACM	land-attack cruise missile
LAN	local area network
LCC	land component commander
LNO	liaison officer
LOC	line of communications
LOMEZ	low-altitude missile engagement zone
LRU	line replaceable unit
MANPADS	man-portable air defense system
MDMP	military decision-making process
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, civil considerations
MEZ	missile engagement zone
MIDS	multifunctional information distribution system
MOS	military occupational specialty
MRBM	medium-range ballistic missile
MRR	minimum risk route
MSR	main supply route
NAI	named area of interest
NATO	North Atlantic Treaty Organization
NEO	noncombatant evacuation operations
NIPRNET	Non-secure Internet Protocol Router Network
NLOS	non-line of sight
NMC	not mission capable
O&O	operational and organizational
OAKOC	observation and fields of fire, avenues of approach, key terrain, obstacles, and cover and concealment
OCA	offensive counterair
OIF	Operation IRAQI FREEDOM
OPCON	operational control
OPLAN	operation plan
OPORD	operation order
OPSEC	operations security
PAC	Patriot advanced capability
PADIL	Patriot data information link
PDB	post-deployment build
PIR	priority intelligence requirement
POL	petroleum, oil, and lubricants
PTL	primary target line
R&S	reconnaissance and surveillance
RADC	regional air defense commander

ROE	rules of engagement
RW	rotary wing
S-1	personnel staff officer
S-2	intelligence staff officer
S-3	operations staff officer
S-4	logistics staff officer
SA	situational awareness
SADC	sector air defense commander
SAM	surface-to-air missile
SBCT	Stryker brigade combat team
SEAD	suppression of enemy air defenses
SHORAD	short-range air defense
SHORADEZ	short-range air defense engagement zone
SIAP	single integrated air picture
SINCGARS	single-channel ground and airborne radio system
SIPRNET	SECRET Internet Protocol Router Network
SLAMRAAM	surface-launched advanced medium-range air-to-air missile
SLBM	submarine-launched ballistic missile
SLS	shoot-look-shoot
SMC	support maintenance company
SOF	special operations forces
SOP	standing operating procedure
SPINS	special instructions
SPOD	seaport of debarkation
SRBM	short-range ballistic missile
STANAG	standardization agreement (NATO)
STL	Secondary target line
STO	surface-to-air missile tactical order
SU	situational understanding
TAAMDCOORD	theater Army air and missile defense coordinator
TACON	tactical control
TADIL	tactical digital information link
TAI	target area of interest
TAMD	theater air and missile defense
TAOC	tactical air operations center
TBM	theater ballistic missile
TCO	tactical control officer
TCS	tactical control station
TEL	transporter-erector launcher
TES	theater event system
TF	task force

THAAD	terminal high altitude area defense
TM	theater missile
TOC	tactical operations center
TRADOC	United States Army Training and Doctrine Command
TSA	theater storage area
TSOP	Tactical standing operating procedure
UAS	unmanned aircraft system
UHF	ultrahigh frequency
UJTL	Universal Joint Task List
UN	United Nations
U.S.	United States
USAF	United States Air Force
USCENTCOM	United States Central Command
USMC	United States Marine Corps
USN	United States Navy
USNORTHCOM	United States Northern Command
USSTRATCOM	United States Strategic Command
VMF	variable message format
WAD	weapons alert designator
WCS	weapons control status
WEZ	weapon engagement zone
WMD	weapons of mass destruction
WMD/E	weapons of mass destruction/effects
XO	executive officer

SECTION II – TERMS AND DEFINITIONS

active air defense

(Joint) Direct defensive action taken to destroy, nullify, or reduce the effectiveness of hostile air and missile threats against friendly forces and assets. It includes the use of aircraft, air defense weapons, electronic warfare, and other available weapons. (JP 3-01)

active missile defense

Operations that protect selected assets and forces from attack by destroying their missile airborne launch platforms and/or theater missiles in flight.

air defense

(Joint) Defensive measures designed to destroy attacking enemy aircraft or missiles in the atmosphere, or to nullify or reduce the effectiveness of such attack. (JP 3-01)

air defense artillery

(Joint) Defensive measures designed to destroy attacking enemy aircraft or missiles in the atmosphere, or to nullify or reduce the effectiveness of such attack. (JP 3-01)

air interdiction

(Joint) Air operations conducted to divert, disrupt, delay, or destroy the enemy's military potential before it can be brought to bear effectively against friendly forces, or to otherwise achieve objectives. Air interdiction is conducted at such distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required. (JP 3-0)

airspace control authority

(Joint) The commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area. (JP 1-02)

airspace control order

(Joint) An order implementing the airspace control plan that provides the details of the approved requests for airspace coordinating measures. It is published either as part of the air tasking order or as a separate document. (JP 3-52)

airspace control plan

(Joint) The document approved by the joint force commander that provides specific planning guidance and procedures for the airspace control system for the joint force operational area. (JP 3-52)

airspace management

(Joint) The coordination, integration, and regulation of the use of airspace of defined dimensions. (JP 1-02)

air superiority

(Joint) That degree of dominance in the air battle of one force over another which permits the conduct of operations by the former and its related land, sea, and air forces at a given time and place without prohibitive interference by the opposing force. (JP 3-30)

air supremacy

(Joint) That degree of air superiority wherein the opposing air force is incapable of effective interference. (JP 1-02)

alert

Attack and launch early reporting to theater.

area air defense commander

(Joint) 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 area air defense commander's headquarters. (JP 3-52)

attack operations

Offensive operations intended to destroy and disrupt enemy theater missile capabilities before, during, and after launch. The objective of these operations is to prevent the launch of theater missiles by attacking each element of the overall system, including such actions as destroying launch platforms; reconnaissance, surveillance, and target acquisition platforms; command and control nodes; and missile stocks and infrastructure.

ballistic missile

(Joint) Any missile which does not rely upon aerodynamic surfaces to produce lift and consequently follows a ballistic trajectory when thrust is terminated. (JP 1-02)

classify

To declare a target to be a ballistic missile or air-breathing object.

close air support

(Joint) Air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces. (JP 3-0)

counterair

(Joint) A mission that integrates offensive and defensive operations to attain and maintain a desired degree of air superiority. Counterair missions are designed to destroy or negate enemy aircraft and missiles, both before and after launch. (JP 3-01)

cueing

Providing timely position data and tentative identification of aircraft within a designated range of a fire unit.

defensive counterair

(Joint) All defensive measures designed to detect, identify, intercept, and destroy or negate enemy forces attempting to attack or penetrate the friendly air environment. (JP 3-01)

engagement operations

Those activities required to execute the air, missile, and counter-surveillance battles.

force operations

Those activities required to plan, coordinate, prepare, and sustain the total air and missile defense mission.

joint force air component commander

(Joint) The commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for making recommendations on the proper employment of assigned, attached, and/or made available for tasking air forces; planning and coordinating air operations; or accomplishing such operational missions as may be assigned. The joint force air component commander is given the authority necessary to accomplish missions and tasks assigned by the establishing commander. (JP 3-0)

joint force land component commander

(Joint) The commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for making recommendations on the proper employment of assigned, attached, and/or made available for tasking land forces, planning and coordinating land operations, or accomplishing such operational missions as may be assigned. The joint force land component commander is given the authority necessary to accomplish missions and tasks assigned by the establishing commander. (JP 3-0)

joint targeting coordination board

(Joint) A group formed by the joint force commander to accomplish broad targeting oversight functions that may include but are not limited to coordinating targeting information, providing targeting guidance and priorities, and refining the joint integrated prioritized target list. The board is normally comprised of representatives from the joint force staff, all components, and if required, component subordinate units. (JP 3-60)

offensive counterair

(Joint) Offensive operations to destroy, disrupt, or neutralize enemy aircraft, missiles, launch platforms, and their supporting structures and systems both before and after launch, but as close to their source as possible. Offensive counterair operations range throughout the enemy territory

and are generally conducted at the initiative of friendly forces. These operations include attack operations, fighter sweep, escort, and suppression of enemy air defenses. (JP 3-01)

passive air defense

(Joint) All measures, other than active air defense, taken to minimize the effectiveness of hostile air and missile threats against friendly forces and assets. These measures include camouflage, concealment, deception, dispersion, reconstitution, redundancy, detection and warning systems, and the use of protective construction. (JP 3-01)

suppression of enemy air defenses

(Joint) Activity that neutralizes, destroys, or temporarily degrades surface-based enemy air defenses by destructive and/or disruptive means. (JP 3-01)

theater missile

(Joint) A missile, which may be a ballistic missile, a cruise missile, or an air-to-surface missile (not including short-range, non-nuclear, direct-fire missiles, bombs, or rockets such as Maverick or wire-guided missiles), whose target is within a given theater of operation. (JP 3-01)

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REQUIRED PUBLICATIONS

These sources must be available to the intended users of this publication.

None

RELATED PUBLICATIONS

These sources contain relevant supplemental information. Most Army doctrinal publications are available on-line at http://www.apd.army.mil/. Most joint publications are available on-line at http://www.dtic.mil/doctrine/s_index.html.

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By order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0930901

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